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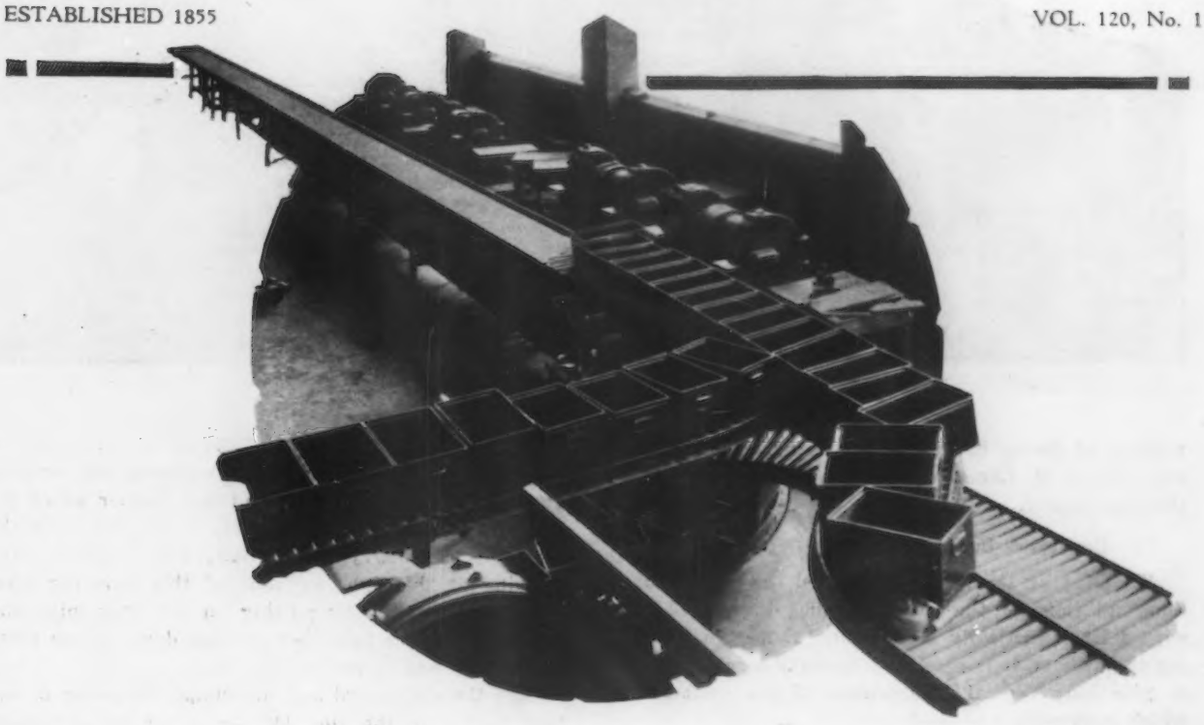


Savings from the Use of Conveyors in Manufacturing

HANDLING of materials through most departments by means of automatic equipment, as a way to cut manufacturing costs, is being employed by the Maytag Co., Newton, Iowa, maker of washing machines. Five preceding articles have told in detail of the foundry, as equipped with conveyors and other types of labor-saving devices. This final installment shows how the same principles are applied to the "manufacturing" departments, particularly in assembling processes. And it shows, also, how some of the former foundry equipment has been rendered redundant, through more intensive use of a smaller

EXPEDITIOUS handling of materials has been the theme running through the six articles devoted to the new Maytag continuous foundry and its manufacturing department, of which this is the last installment. Proportioning of speed of delivery of sand, castings, assembly parts, to the physical capacity of the recipient to use them as they arrive was the keynote in the design.

Conveyors of many types were incorporated in the whole. Overhead tramways carry hot metal to pour the castings and carry partly assembled parts to the place where they go together in making a complete washing machine. Belt conveyors carry sand and coke to place of use. Roller conveyors are used for castings going to and through the grinding and polishing department. Wheeled trucks or carts handle cupola charges, gather scrap from the manufacturing operations and feed new sand to the system, as needed.

Each of the several pieces of equipment is placed where it will be most advantageous to have that particular type of service, and all, together, make up a harmonious whole functioning as a well-ordered unit. Thus the coordination of parts themselves dissimilar results in an exceptionally well-conceived whole.

FIG. 1—Assembling Tubs and Crowns. The two pieces are pressed and riveted together and then pass away on the parallel gravity carrier shown in the center

number of flasks, bottom boards, sand cutters, ladles, etc. Henry M. Lane Co., Detroit, was responsible for the new layout.

Conveyors in Manufacturing Department

The Maytag Co. has systematized the general handling all through the plant and has introduced conveyors into practically every unit. Hence, in describing the system, it is necessary to make a selection and to give only typical illustrations of the methods in which conveyors are used.

For this purpose we will start with the assembly of the machine proper. Fig. 1, taken on the third floor of the general machine shop and assembly building, shows where the tubs and crowns first come together. They are assembled on two lines of gravity carriers as shown in the center of this illustration. The crowns are fitted on to the tubs and the two then pressed together. The assembled tub and crown pass along on these parallel gravity carriers to a spiral chute which delivers them to the second floor, as shown in Fig. 2.

In the background of this illustration can be seen the spiral carrier and overhead is a carrier which delivers the bottom plate assembly to a point over the conveyor line carrying the tubs and crowns. Men working at the right and left of this conveyor complete the assembly by putting on the drain pipe and other parts. The tubs then proceed down to the point where they are to receive the legs.

The three standard legs are simply bolted on as the tubs pass down this line, but the power leg introduces another element. Fig. 3 shows the power leg assembly line. This is a special conveyor along which all of the parts for the power leg are distributed on suitable benches. Workmen at these various stations perform the different operations of assembling a complete power leg.

When the power leg is complete it is transferred to another conveyor, shown in Fig. 4. This illustration also shows the tubs with the three standard legs as-

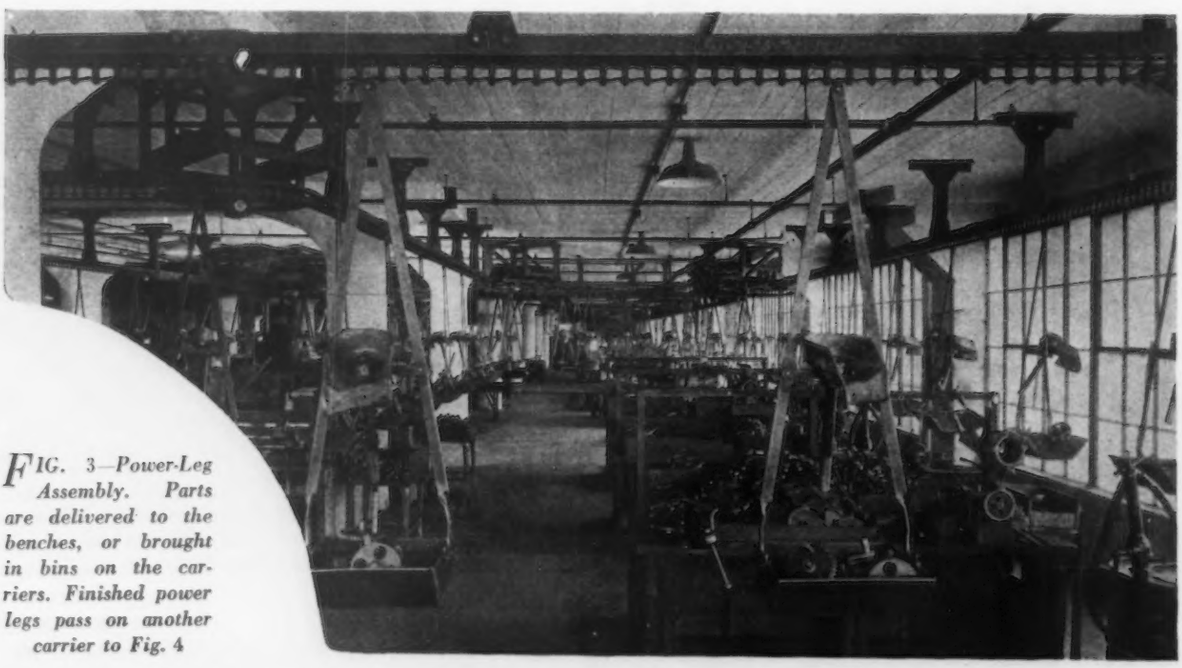


FIG. 3—Power-Leg Assembly. Parts are delivered to the benches, or brought in bins on the carriers. Finished power legs pass on another carrier to Fig. 4

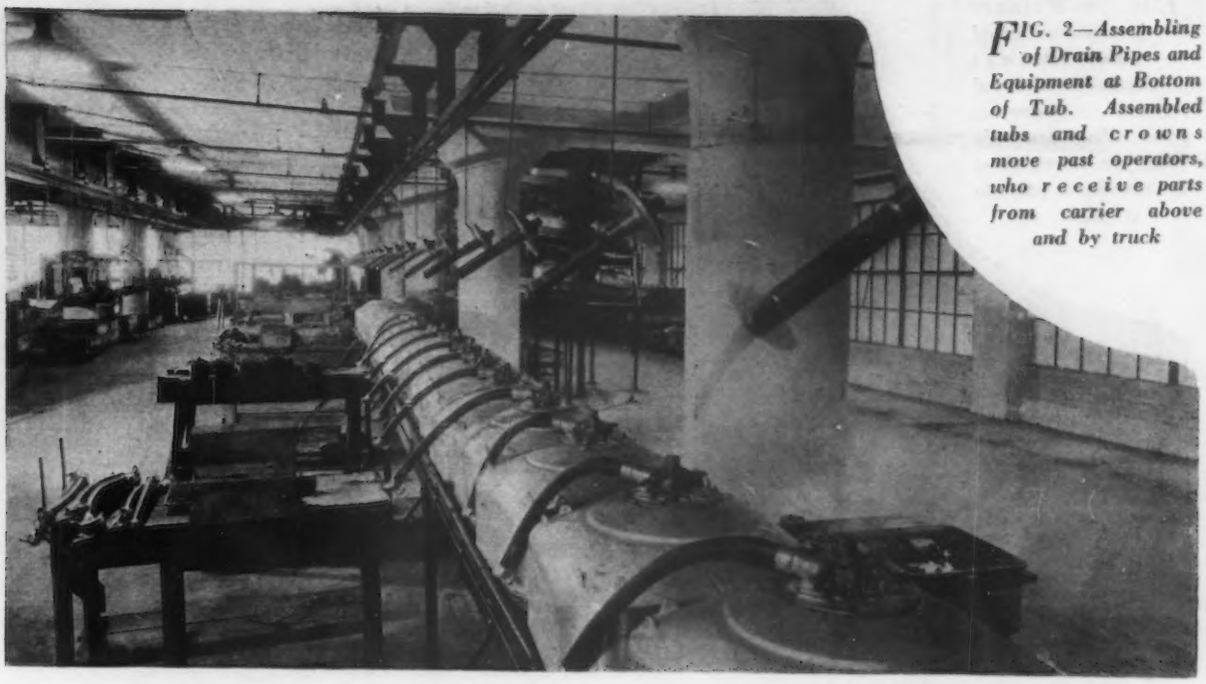


FIG. 2—Assembling of Drain Pipes and Equipment at Bottom of Tub. Assembled tubs and crowns move past operators, who receive parts from carrier above and by truck

sembled and the power leg assembly conveyor above them. The workmen pick off a tub with its three legs and lay it on one of the benches in the center foreground. They then place the power leg assembly in position and secure it to the other parts to which it must be attached. The machines are then lifted and placed on their own casters on the conveyor at the left, and they feed down toward the successive operations necessary to complete the machine.

We now turn aside from the general assembly to see the wringer operations. After the wringer parts are brought together on proper work benches, and the different parts put together, the finished product passes on to the wringer assembly conveyor, shown in Fig. 5. At the left the conveyor passing out of view carries a wringer ready for uniting with the rest of the machine.

Fig. 6 shows where the wringer assembly conveyor brings the wringers to a point where they are finally assembled on the tubs. As the tubs proceed toward the end they are equipped with the wringers and finally pass off the end of this conveyor, a complete washing machine so far as the mechanism is concerned. This machine is subsequently painted and then the motor is introduced, after which it is ready to be crated and shipped.

Savings from Continuous Foundry Work

WHERE castings are made in such a way that the entire molders' output must be on the floor before pouring, it means that it is necessary to provide as many bottom boards as the number of molds a molder can put up in a day. Where solid iron flasks are used, it is necessary also to provide as many flasks as will be required. In any case the floor area required must be sufficient to take care of his entire day's output. If resort is had to the stacking of molds to save space, we immediately run into the liability of spoiling molds —first, by getting dirt down the sprue hole; second, by crushing molds when they are piled or stacked. In any case, stacking requires extra labor.

A remarkable illustration of the saving which could

FIG. 4—Applying Power Leg to Washing Machine. After the power legs, taken from upper conveyor, are attached, the machines are set up on their own casters

FIG. 6—Wringer Conveyor (ahead at right) Brings Wringers to General Assembly Conveyor. Men along assembly conveyor attach them as machines pass to right

be effected by passing to continuous molding with sand-handling equipment became apparent when the Maytag Co. started its new continuous foundry. In the old shop it was necessary to provide more than 100 flasks for each of the many operators, and then the molder actually molded only about 6 hr. a day.

With the new layout the molders mold all day, but they require only five or six flasks apiece, as the flasks are constantly coming back to them as they are shaken out. The result is that, while the old foundry had only a comparatively small percentage of the output of the new foundry, most of the flask equipment immediately became unnecessary and was left in the old plant. Fig. 7 shows a number of stacks of flasks and bottom boards thus abandoned. It will be noticed that some of these are expensive flasks with cut partings.

In the new foundry the sand is automatically handled and tempered. One man looks after the tempering of all the sand and two men control the gates and plows for its distribution to the various parts of the plant. The new plant is using several times as much sand in total as the old, but the old required three sand cutters which are now abandoned, as shown in Fig. 8.

These sand cutters had been a very efficient method of handling the cutting in the old plant, and had saved much money from the old hand methods. But the new automatic method of handling sand greatly reduced the labor. And it gives a better product than could be obtained from the sand cutters, because the new method riddles the sand and removes the scrap iron by means of a magnetic separator.

In the old foundry all iron was pushed from the cupola to the floors by means of hand-pushed trolley ladles, a considerable battery of which is seen at the left of Fig. 8. In the new plant three man-riding ladle cranes distribute all the iron. Because the iron is distributed continuously throughout the day, and the castings shaken out in the same way, molders are enabled to mold all day. This has increased the total

FIG. 7—Some of the Flasks Abandoned as Unnecessary When Continuous Molding and Pouring Was Started. Flasks released ten minutes after pouring are used over and over

FIG. 5—Wringer Assembly. Various parts of the wringers are brought to this bench and finally assembled. The wringer passes out on the carrier at the left

output per man-hour, and at the same time done away with much of the cleaning labor necessary in the old system.

Electricity, Quartz and Coke Required to Produce Ferrosilicon

A study of a modern 4500-kw. furnace for the production of 45 per cent ferrosilicon is published in the *Z. Angewandte Chemie*, 1927, p. 141. An abstract* of the article is given below.

The furnace belonged to the Koholyt A.G., Berlin, Germany. The production for several years was studied and the following average results obtained:

Per metric ton of ferrosilicon produced, there were used 1110 kg. quartz (containing 97 per cent silica), 560 kg. steel turnings (containing 98 per cent iron, 0.5 per cent carbon and 1.5 per cent ferric oxide), 400 kg. anthracite (containing 8 per cent ash), 210 kg. wood charcoal (containing 80 per cent fixed carbon and 3.4 per cent ash) and 70 kg. coke (containing 90 per cent fixed carbon and 7 per cent ash). The ash of the coke and anthracite contained about 50 per cent silica. The electrode consumption amounted to about 60 kg. per metric ton of reduced ferrosilicon.

Of the silicon charged into the furnace 12 per cent was volatilized and 88 per cent entered the ferrosilicon. Similarly 2 per cent of the iron was lost in vapor and dust, while 98 per cent went into the ferrosilicon. Of the carbon 18 per cent was lost by combustion at the top of the furnace, 5 per cent was required to reduce the ferric oxide, 10 per cent to the reduced and volatilized silicon, leaving 67 per cent for the useful work of reducing the silicon which entered into the alloy.

In the energy balance 4 per cent transformer loss and 4 per cent conductor loss occurred. Twenty per cent lost to radiation and conduction left 72 per cent of the electrical input for chemical and physical reactions. Of this 9 per cent was required to volatilize the silicon lost, and only 63 per cent went into useful work. The total energy consumption was 5900 kwhr. per metric ton of 45 per cent ferrosilicon.

*By James Silberstein, Wilkinsburg, Pa.

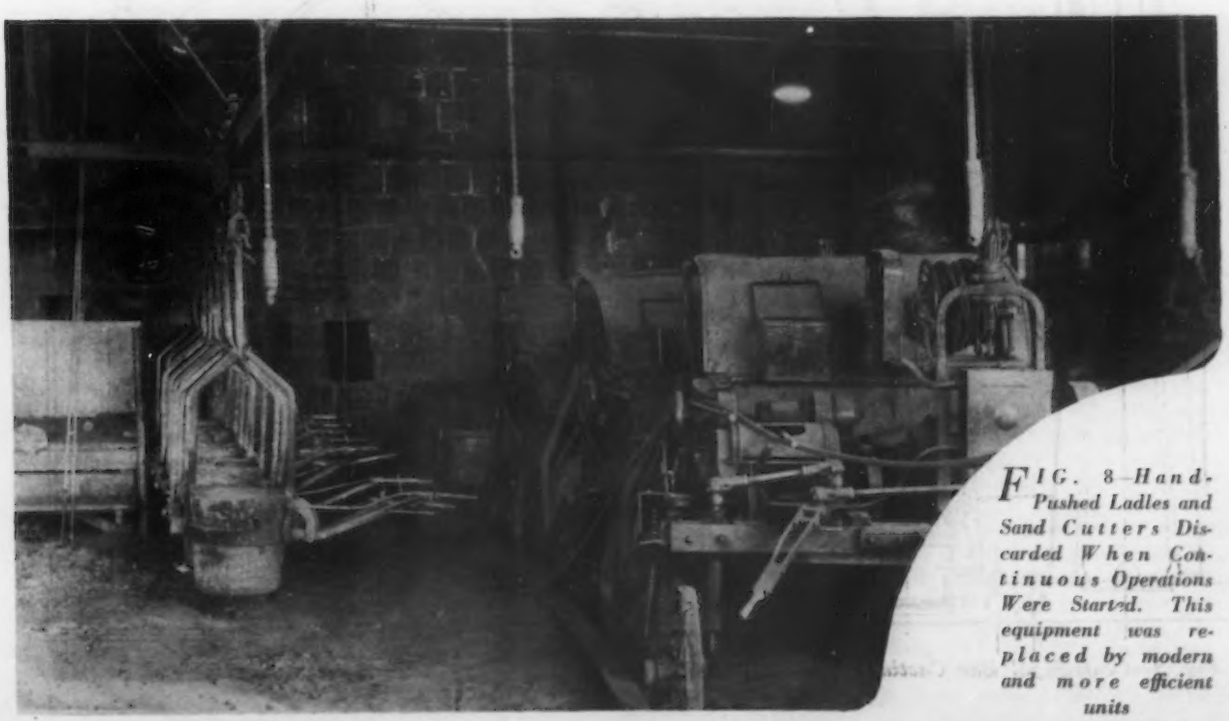


FIG. 8—Hand-Pushed Ladles and Sand Cutters Discarded When Continuous Operations Were Started. This equipment was replaced by modern and more efficient units

Casts Steel Bars Centrifugally

New Mechanical Device Calculated to Eliminate Blooming Mill—How It Operates—Advantages Claimed

BY LEON CAMMEN

CENTRIFUGAL bar casting is, to all practical purposes, a new art. While several attempts have been made to cast bars, gears, etc., in the past, none of these led to satisfactory results and practically all such attempts were usually abandoned after a few trials and without comprehension of the reasons which made the attempt abortive.

Early Attempts Not Successful

Referring to Fig. 2 and considering only the barrel part of the mold A, one will see what amounts to a mold for casting tubular shapes. It differs from such a mold, however, because of the presence of partition lugs B. Assume now that we employ this mold in the same manner as we would employ a mold for making tubular castings, as has been actually done by a number of would-be inventors of centrifugal bar casting. Offhand one would suppose that the problem is simple. Centrifugal force throws the metal to the wall and if the metal be delivered to such mold as shown here, it ought to be thrown to the bottom of the cavities between the partition lugs and form little ingots therein. It actually does it in so far as the forming of the ingots is concerned. The only trouble is that the metal thus formed is absolutely worthless. A clear understanding of the reasons for this failure will give an inkling as to the metallurgical mechanism of centrifugal bar casting.

The mold shown in Fig. 2 is spinning on a horizontal axis. The partition lugs may be anywhere from 5 to 15 in. long, the inside diameter of the mold from 50 to 100 in. and the speed of the order of 6000 ft. per min. on the inner surface. When molten metal is coming down from the spout into a mold of this size and running at such a speed, it is apt to be hit by the partition lugs and broken up into a fine spray. This spray instantly chills in the air and comes down into the metal in the form of shot. Some of this shot is remelted and reincorporated into the metal, some of it is not. The result is that when the bar is rolled, the cold shot is knocked out and holes are left in the rolled product. Some years ago at the works of a certain electrical company, bars were made by this process. After casting they looked fine, but when rolled out into sheet the product had more the appearance of a screen than of sheet.

The difficulty has been overcome in the Cammen process (the writer begs to apologize for the use of his name in this connection, but cannot help doing so, as practically the entire work in the development of the bar casting process within the last five years has been done by his own organization and incorporated in patents issued in his name) by the construction shown in Fig. 3. The metal is teemed against the smooth-walled, restricted neck E of the mold; here the metal is picked up by the rapidly spinning mold and pressed by centrifugal force against the wall of the mold. It cannot get out of the mold, because of the presence of the collar G, and therefore has to go the other way. It is thus forced down over the shoulder H, gaining in centrifugal force as this is done, because of the increase in diameter.

By the time it reaches the beginning of the partitions at J, it is already spinning at the same rate as

Portion of a paper, "Centrifugal Casting of Steel," presented at the winter sectional meeting of the American Society for Steel Treating. The author is a consulti -ngineer, 29 West Thirty-ninth Street, New York.

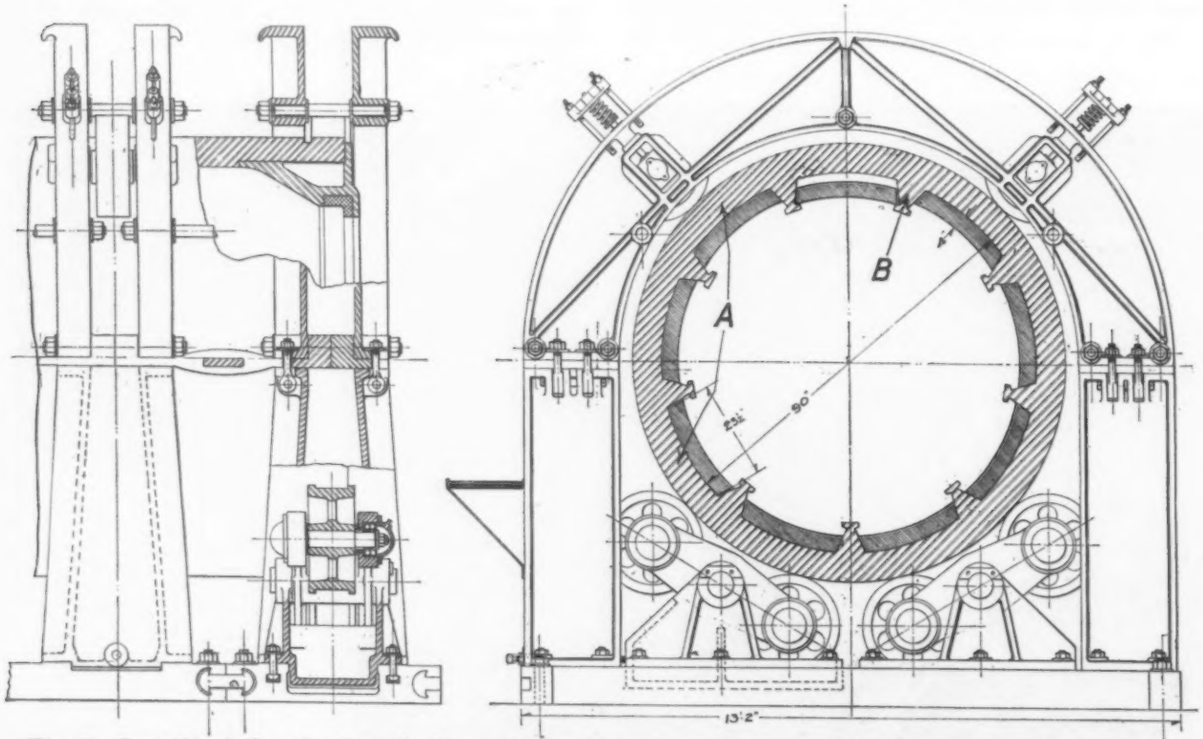


Fig. 2—Centrifugal Bar Casting Machine. Section through vertical plane at right angle to axis of rotation (inside mold diameter 90 in.)

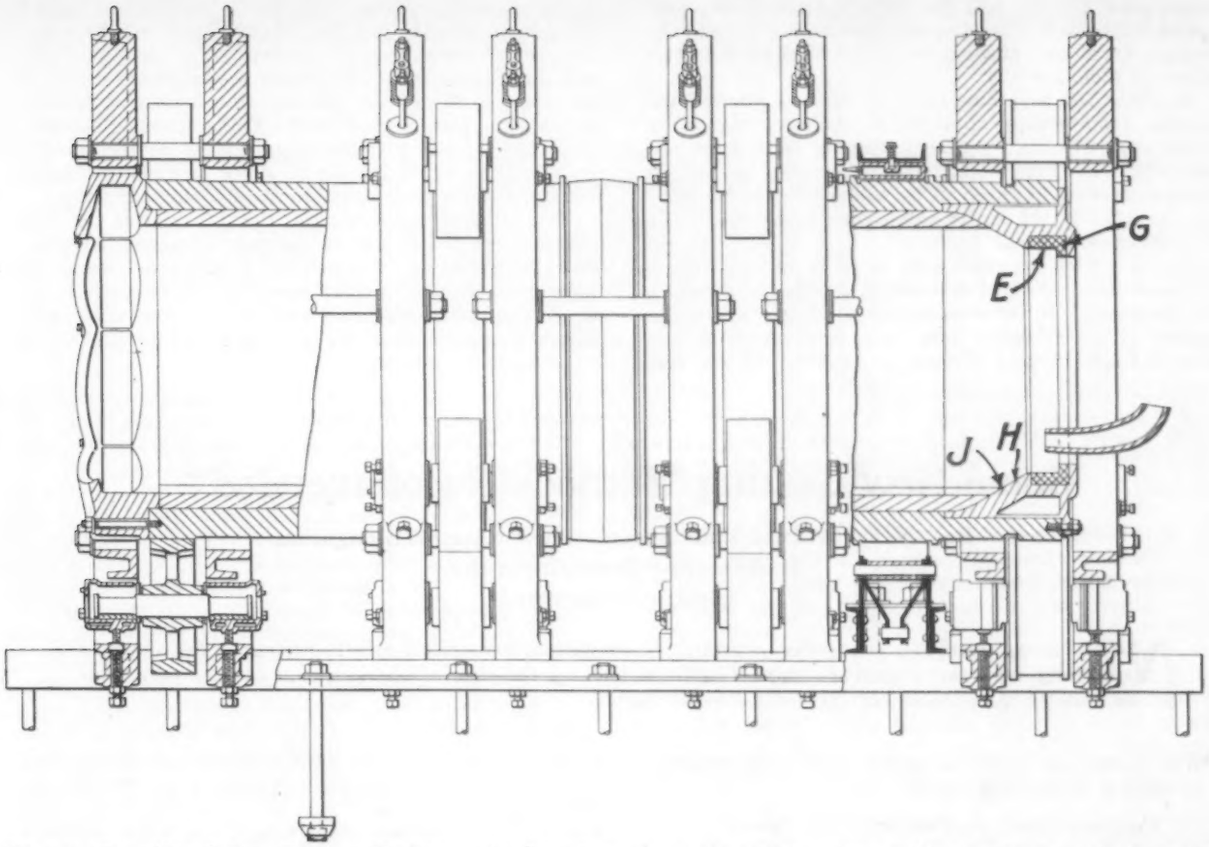


Fig. 3—Centrifugal Bar Casting Machine. Section through vertical plane along axis of rotation (inside mold diameter 53.5 in.)

the partitions themselves. There is therefore no relative motion between the two and no blow, the metal generally flowing around the shoulders of the partition lugs and filling the spaces in between. This is what is actually happening in the machines and resulting in the production of bars absolutely free from cold shuts. The use of this device at the end of the mold, called "bottle neck," is one of the characteristics of this process. Equivalent designs have been developed and covered by patents. The only one, however, which is believed to have a real production value is the one shown in Fig. 3.

Mechanics of Centrifugal Bar Casting

What happens when bars are cast and why is this process believed to have a metallurgical and technical value? In contradistinction to centrifugal tube casting, centrifugal bar casting permits the handling of large amounts of metal from perhaps 5 or 6 tons for sheet, bar and wire rod molds up to some 30 tons per machine in rail and structural steel billet casting. Because of this a close control can be had on the rate at which molten metal is delivered to the spinning mold. As the first metal comes in, it instantly freezes, probably close to the beginning of the partition lugs. The next metal, however, flows a little way over the hot metal previously solidified, rather than over the cold wall, which gives it a chance to reach further out into the mold and really produces an equivalent of tube casting in a hot mold. In this way, from the first metal teemed from the ladle, a thin layer is formed the full length of the mold, which may be anywhere from 6½ ft. to 14 ft. and more long. As the next metal comes in, it is flowing over the layer of extremely hot metal which has just solidified.

It is important to teem the metal from the ladle into the machine at such a rate that at no time should there be a layer of molten metal present of a thickness greater than say ¼ in. As will be made clearer later, the rate of teeming is one of the most vital influences affecting the structure of the cast bars.

A continuous process now takes place. As more molten metal is added at the top of the layer of molten metal already present, the bottom of this layer solidifies and in this way the thickness of the solid layer is increased while that of the molten layer stays approximately without change. This has several results. In the first place the solidification of the metal proceeds at a fast rate so that roughly not more than 30 to 45 sec., and possibly much less, elapses between the time the metal leaves the ladle and the time it solidifies in the mold. Compare this with, say, 15 min. to ½ hr. that the same process takes inside of a 3-ton ingot under the usual practice. It is this very great rapidity with which the metal freezes that makes it practically impossible for segregation to take place.

Centrifugal Bar Casting Has Advantages

The question may be raised as to what are the advantages of centrifugal bar casting as compared with the present method of ingot casting and blooming. Not enough work has been done yet to establish with certainty that centrifugally cast material possesses properties essentially superior to steel, well made by the conventional process. It has been found that if the metal is dirty in the ladle, it will be dirty in the casting, so that centrifugal casting is not a cure for poor furnace operation. On the other hand, there is good reason to believe that, in properly made centrifugally cast metal, segregation will be entirely eliminated or at least greatly reduced.

The main value of centrifugal bar casting (and herein it differs materially from centrifugal tube casting) lies however in the stark matter of costs. The reduction of cropping from an average of 12 per cent (running as high as 20 per cent in some special cases, such as rails) to about 2 per cent, and the elimination of the entire blooming operation with all it implies, are equivalent to a reduction in costs of from $3 to as high as $6 per ton on standard products, as shown in detail in the report of Barton R. Shover (reprinted in part in Appendix I in original paper).

This is not the whole story yet, however. A committee of the American Iron and Steel Institute (chairman, C. O. Hadly) recently made a report on quality classification and average extra costs above base of various kinds of steel blooms, billets and slabs. The special requirement in Class SR is that surface be free from visible imperfections. Centrifugally cast bars, properly made, are free from such imperfections on

three sides always, and the fourth (innermost) side can be milled at a cost of some $0.10 per ton, while the average extra cost above base as specified by the committee is $2.50 per ton.

In Class DR a similar extra of $2.50 is allowed for freedom from piping obtained in ordinary ingots by special top discard. As centrifugally cast bars are naturally free from piping, except possibly on the innermost face (and this can be taken care of by milling), practically the entire extra goes into extra profit with the new process.

In Class SDR an extra cost of $5 is specified for a combination of special requirements of the two classes just discussed. It becomes practically extra profit for makers of centrifugally cast bars, and the same applies to Class F steel of forging quality. If you add to the above the saving indicated by the Shover report (Appendix I in the original paper), there will be a difference in costs between centrifugully cast products and those made from ingots cast in stationary molds of the order of $6 to $8.50 per ton, an enormous difference in costs for plain carbon steel. This difference in costs, even apart from possible improvement in the quality of products, would appear to serve as sufficient justification for the development of centrifugal casting.

To existing steel plants the elimination of the blooming mill will not be entirely welcome, perhaps. Few like to think of scrapping $100,000,000 worth of equipment, some of it very new, even if economies are to be secured by such an operation. New mills will however appreciate a cut in initial cost of $2,000,000 to perhaps $2,500,000.

Some New Testing Methods Recommended*

Best Way to Test Thin Sheets—How Rate of Elongation Is Affected—More About the Electric Telemeter

NEW testing methods, committee reports, the executive committee's annual review of the society's activity, and the president's annual address took up the time of one session. Besides four committee reports, four technical papers were presented.

TWO of the four technical papers dealt with methods of testing thin sheet metals.

Progress Made in Testing Thin Sheets

IN a paper entitled "Methods for Determining the Tensile Properties of Thin Sheet Metals," R. L. Templin, chief engineer of tests, Aluminum Co. of America, New Kensington, Pa., described methods of determining the tensile properties of thin metals varying in thickness from 0.005 to 0.250 in., inclusive.

An extensive series of tension tests, carried out on sheet metal of various grades and thickness is reported on by J. T. Nichols and two associates in a paper, "Tension Test Specimens for Sheet Steel." The authors are associates with the research laboratory of the American Sheet & Tin Plate Co., Pittsburgh. Seven different test specimens were used. The results show that the yield point and tensile strength are only slightly affected by the shape.

As a factor in the interpretation of the physical characteristics of a material, the rate of elongation is recognized as important, said J. Hammond Smith, professor of civil engineering, University of Pittsburgh, Pittsburgh, in a paper, "Rate of Elongation in Tension Tests." His conclusions are based on a series of tests planned to show the variation of rates throughout the critical stages for various sizes and shapes of specimens and various methods of grouping.

Use of Electric Telemeter Broadens

Further development and practical applications of the electric telemeter, described at the society's annual meeting in 1923 [THE IRON AGE, July 5, 1923, page 15], are discussed in a paper, "Recent Developments and Applications of the Electric Telemeter," by O. S. Peters, electrical engineer, United States Bureau of Standards, Washington.

Hardness Testing Standardized

Committee E-1's report on methods of testing, presented by J. A. Capp, its chairman, discussed requirements for a standard tension test specimen for testing thin sheet metals and recommended the advancement to standard of the methods of Brinell hardness testing of metallic materials and methods of calibration of testing machines by means of a calibration bar.

*Part of the report of the annual convention of the American Society for Testing Materials at French Lick, Ind., June 20 to 24.

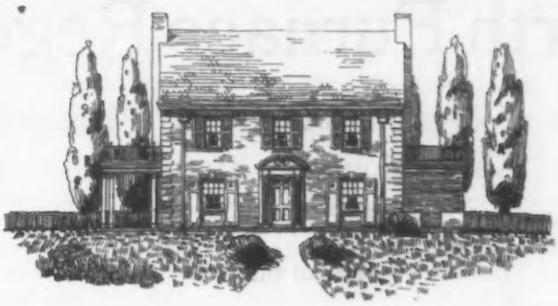
To Exhibit at New Haven Machine Tool Show

Thirty-eight companies had contracted for space on July 1 for the New Haven Machine Tool Exhibition to be held Sept. 6 to 9, inclusive, at Yale University, New Haven, under the joint auspices of the New Haven section of the American Society of Mechanical Engineers, the Department of Mechanical Engineering of Yale and the New Haven Chamber of Commerce. Following is the list of the companies:

Air Reduction Sales Co., 342 Madison Ave., New York, G. Van Alstyne.
Bausch & Lomb Optical Co., Rochester, N. Y., Max Poser.
E. W. Bliss Co., Brooklyn, N. Y., F. D. Beattie.
Botwinik Brothers, New Haven, Hyman Botwinik.
Bristol Co., Waterbury, Conn., J. B. Kelsey.
Buffalo Forge Co., Buffalo, E. G. Leonard.
Bullard Machine Tool Co., Bridgeport, Conn., E. T. Blanchard.
Clipper Belt Lacer, Grand Rapids, Mich., Fred E. Best.
C. J. Dickgiesser, Derby, Conn., C. J. Dickgiesser.
Divine Brothers Co., Utica, N. Y., H. E. Boardman.
Eastern Machine Screw Corporation, New Haven, F. J. O'Rourke.
Fafnir Bearing Co., New Britain, Conn., R. N. Hemmenway.
General Electric Co., Schenectady, N. Y., R. H. Van Horn.
Geometric Tool Co., New Haven, G. A. Denison.
Goss & DeLeeuw, New Britain, Conn., S. T. Goss.
Jones & Lamson Machine Co., Springfield, Vt., H. S. Beal.
Keller Mechanical Engineering Corporation, Brooklyn, N. Y., Jules Dierckx.
Machinery Dealers' Corporation, New Haven, C. C. Sibley.
Manning, Maxwell & Moore, New York, A. W. Clem.
National Acme Co., Cleveland, A. E. Henn.
New Britain Machine Co., New Britain, E. L. Steinle.
New Departure Mfg. Co., Bristol, C. F. Olin.
New Haven Gas Light Co., New Haven, J. A. Norcross.
Noble & Westbrook Mfg. Co., Hartford, W. C. Westbrook.
O. K. Tool Co., Shelton, Conn., F. J. Wilson.
N. W. Ordway & Son, Hartford, N. W. Ordway.
Oxweld Acetylene Co., Long Island City, N. Y., Z. Davis.
Penn Pump and Compressor Co., Easton, Pa., W. C. Peck.
Pneumatic Drop Hammer Co., Boston, W. H. J. Fitz-Gerald.
Potter & Johnston Machine Co., Pawtucket, R. I., W. W. Potter.
Pratt & Whitney Co., Hartford, C. R. Burt.
Purinton & Smith, Hartford, L. A. Smith.
Racine Tool & Machine Co., Racine, Wis., M. E. Erskine.
S.K.F. Industries, Inc., New York, Wm. Jetter.
Standard Machinery Co., Auburn, R. I., J. H. Connolly.
Timken Roller Bearing Co., Canton, Ohio, R. P. Kelley.
Torrington Co., Torrington, Conn., J. W. Blackford.
Triplex Machine Tool Co., New York, John Cetrule.

Steel Frame Adapted to Large Dwelling

J. & L. Junior Beams Used in Nine-room House at Pittsburgh



Framework Taking 17 Tons of Steel Erected in Four Days

THE nine-room steel frame dwelling now being built for Charles L. Workman on South Negley Avenue, Pittsburgh, represents one of the latest, but not an essentially new, expression of the possibilities of the use of steel as a substitute for lumber. In this house efforts were made to secure a type of frame that could be fabricated with a minimum of shop detailing and could be erected easily and quickly by comparatively inexperienced workmen.

The building is the result of more than a year's study by Charles W. Tufts, consulting architect, junior beam division, steel construction department, Jones & Laughlin Steel Corporation, Pittsburgh. Selection was made from the rough drawings of Mr. Tufts' plans, and detailed plans were made by J. Phillips Davis, also of the Jones & Laughlin junior beam division.

Framework Erected in Four Days

The house is 28 ft. wide and 48 ft. long, of center hall type, containing a living room, dining room, kitchen, pantry and breakfast room on the first floor; three bedrooms, two baths and dressing room on the second floor; maid's room, bath and storage rooms on the third floor. In the basement is built a two-car garage. Approximately 17 tons of steel were used in the frame of the house, but this is a very much larger tonnage than would have been necessary without the built-in garage, which necessitated the use of standard size structural members to support the load above. For floor beams, studs and rafters J. & L. junior beams were used. Four days were required to set up the frame of the building. The frames of a six-room bungalow built by the Jones & Laughlin corporation at Woodlawn, Pa., requiring 8 tons of steel and of a six-room two-story house taking 8¼ tons were erected in two days each.

In planning the steel frame for the Workman house, a standard spacing of 2 ft. was adhered to for the studs, floor beams and roof rafters. The beams were connected with simple angle connections and the webs were punched with 9/16-in. holes at intervals of 3 in., starting 1½ in. from each end of the member. This punching facilitated erection and was useful in wiring and in furnishing support for plumbing and heating pipes.

The walls consist of 6-in. junior beam studs covered on the outside by a 1½-in. cork board insulation and a 4-in. brick veneer securely fastened to the studs by wire ties. On the inside the studs are covered with tinted plaster on metal lath. Junior beam rafters covered by pre-cast gypsum slabs are used in the roof. The floor is made of a 2-in. concrete slab poured on a permanent metal lath centering supported by junior beams on top of which 13/16-in. oak flooring is nailed to wood screeds. The partitions are cinder block and will be covered directly with a tinted plaster finish.

Plumbing throughout is of brass and the hardware is of lever type colonial design. Heating equipment is of the latest hot water design, and gutters, drainspouts, flashing and roof decks are all of copper. Both porches and the entrance stoop are covered with ornamental slate. The windows are of plate glass.

Costs Met by Low Depreciation and Upkeep

With such construction depreciation has been reduced to a minimum, the only items requiring attention being window frames and sashes, which will require an occasional coat of paint, and the hard finished surface walls, which may need an occasional brightening trim.

The cost of the house probably was high compared with that of the wood frame structure, but the extra outlay was met by the promise of greater durability of steel as compared with lumber, which must mean a longer life; fireproof construction, which may be reflected in lower insurance costs, and little likelihood of loose floors and destructive plaster-cracking found in the average wood-framed dwelling.

SHOWING the Cork Board Insulation Being Attached to the Steel Framework of the House. Work has begun on the brick veneer in the lower part of the building. Perforations for the attachment of the outer covering may be seen at the left end of the house

Open-Hearth Furnace Regenerators

Elements of Design for Proper Passages, Heat Absorption and Strength— Suggested Type

BY FRED H. LOFTUS*

EXPERIMENTS of the Siemens brothers in 1857-61 developed the basic principle necessary for successful application of the open-hearth furnace as a means for the manufacture of steel. These experiments related to the process of preheating the air and gas for combustion, all of which was accomplished by means of regenerators. The fundamental elements required for the production of high temperature in an open-hearth furnace are the regenerators and ports.

Present Conditions

It is not difficult to alter the port arrangement, but on furnaces where the capacity has been increased regenerators cannot be altered without considerable expense and loss of time. Building restrictions, loss of production and the expenditure required to enlarge the regenerator chamber place obstacles in the path of the operators. In view of this it is unfortunately true that many furnaces are operating with checker work entirely too small and not functioning to the fullest extent. With such a condition prevailing, the basic principles of the regenerative furnace established 70 years ago are only in part utilized.

It has been the desire of every operator to obtain a checker which would give the maximum heat absorption from the waste gases and the maximum degree of preheat to the incoming air and gas, together with an efficient and economic campaign.

Various Types in Use

There are various styles of checkers, but the ones most commonly used are formed from standard 9-in. brick and the 10½ x 4½ x 4½-in. checker block. These are usually laid up with a vertical flue opening of approximately 36 sq. in. sectional area.

Sometimes the 9-in. checker is laid on the flat and sometimes on edge. In either case there are longitudinal and horizontal flues, in addition to the vertical flues. In computing the exposed area all surfaces are taken into consideration, regardless of the fact that a portion of these surfaces are not directly in the path of the gases. In so doing 9-in. checker brick laid on the flat give approximately 15 sq. ft. per cu. ft. of material, 9-in. checker brick on edge give approximately 13½ sq. ft. per cu. ft. of material, 9-in. checker brick on edge staggered give 16½ sq. ft. of surface for every cu. ft. of material, 10½ x 4½ x 4½-in. brick give approximately 8.4 sq. ft. of surface per cu. ft. of material.

Straight vertical flue checkers, with 5½ x 5½-in. opening, formed from blocks 13½ x 6 x 3 in., has been used and has given an exceedingly long campaign. It has been found that this type of checker does not readily clog, due to its straight flue opening. However, with such a design it is impossible to get the proper weight in a given space or the proper amount of exposed surface per cu. ft. of material. The straight flue checkers with 5½ x 5½-in. opening permit about 6½ sq. ft. of surface per cu. ft. of material. With such a checker design the furnace clears very nicely, but does not properly regenerate the air or gas, resulting in a slower working furnace.

In any design of checker depending upon the area exposed to the longitudinal and lateral flue openings, the efficiency of the checker will be of short duration, due to the fact that there is little or no lateral circulation of gas in the checker chamber. In view of this, these openings form dead pockets in which dust and dirt rapidly accumulate, and eliminate a large percentage of exposed area. This usually occurs after a period of 125 or 150 heats and materially affects the operation of the furnace.

In small regenerator chambers 9-in. checkers sometimes collapse, due to operating at abnormal temperatures and their inability to support their own weight when operating at such temperatures. Under such circumstances operators have substituted a 10½ x 4½ x 4½-in. block to give the necessary strength. Such a substitution will no doubt permit a longer campaign and a greater recovery or salvage of material, but it does not permit a sharply working checker.

Thickness of Material

It is generally conceded that a checker block should not be over 3 in. in thickness, due to the fact that the heat does not penetrate over 1½ in. from the surface. Any material in excess of 3 in. in thickness is a loss, as far as heat absorption is concerned.

Conditions in a regenerator cannot be fully satisfied by either the 9-in. checker or the 10½ x 4½ x 4½-in. block. The larger blocks have the necessary strength but cannot be considered efficient, due to the fact that they have fewer openings or passages for the gases to enter or leave the furnace. The material in the large block does not function to its fullest capacity, owing to the thickness, and the campaign is very short, owing to the rapid accumulation of dirt in the lateral and horizontal flues. The 9-in. checker is efficient from the heat transfer point, but does not have sufficient strength to prevent the checkers from sagging, nor sufficient weight to give proper thermal capacity.

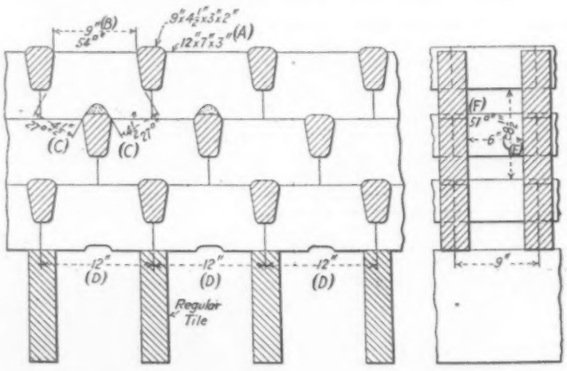


Fig. 1—Checkers of Two Brick Shapes Laid Upon Regulation Tile and Designed for Maximum Absorption of Heat and Minimum Obstruction to Flow of Gases. Sizes and clearances shown are for one size of brick—12x7x3 in. For brick 9x6x3 in. (A), B becomes 6 in., C is 3 in. or 18 sq. in., D is 9 in., E is 7½ in. and F is 45 sq. in.

Present Method of Calculating

There are various methods used in arriving at proper capacity and requirements for checkers. These methods are based on either weight, cubical contents of regenerator or exposed surface. There is a wide variation of opinion by furnace builders.

In reality the requirements should be defined by the weight of checker brick, exposed surface and area of flue openings. The weight is governed by the thermal

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capacity required to store sufficient heat to preheat a known volume of air to a known temperature for a known period of time. The exposed surface is regulated by the volume of air which must contact with the surface of the determined weight of brick to obtain the transfer of heat. The area of the flue openings is governed by the volume of waste gas passing through the checker work at the proper velocity to obtain efficient heat transfer without undue clogging.

Simple Method of Calculating

By a simple method of computation which I have compiled, the proper weight for ample thermal capacity may be determined by using one pound of checker brick in each air chamber for each pound of steel produced per heat, with not less than 0.06 sq. ft. of exposed surface per pound of checker brick. The size or capacity of the passages or flues through the checkers, determined by the volume of waste gas, should equal 0.99 sq. ft. per ton of capacity for both the air and gas chambers. The air chamber should have a ratio of two to one over the gas. The flue passage per ton of capacity through the air chamber would be approximately 1.65 sq. ft. The flue passage through the gas chamber would be 0.825 sq. ft. per ton of capacity.

Under ordinary furnace conditions, with producer gas as fuel, the area of these passages will permit a calculated velocity of 400 ft. per min. To obtain the best results in the upper portion of the checkers, from the standpoint of heat transmission, the total area of the passage should be such that the velocity of the gases entering the checker will not exceed 600 ft. per min. In the latter case, the area of the flue passage per ton of steel produced would be 1.1 sq. ft. for the air chamber and 0.55 sq. ft. for the gas.

Effect of Flue Area on Velocity

The velocity at which the gas travels through the regenerator is an extremely important factor. Let us assume that all vertical passages through the checkers

Details of Characteristics for a Regenerator Chamber 10 Ft. 9 In. x 27 Ft. x 12 Ft. 6 In.

	Ordinary Type Checker		Proposed Type Checker	
	10½x4½ x4½ In.	9-In. Edge	6x9 In.	6x6 In.
Number required.	9,500	17,468	8,505 L-3 9,000 L-1	11,025 L-2 11,325 L-1
Weight, lb.	175,000	153,000	240,750	222,500
Volume, cu. ft...	1,165	1,020	1,605	1,485
Exposed area, sq. ft. per cu. ft...	8.4	13.5	8.8	9.22
Exposed area when new, sq. ft.	9,000	13,770	14,100	13,700
Exposed area when old.....	3,600	7,110	13,175	12,280
Area lost by accumulation ...	6,200	6,660	1,125	1,420
Total area of flues, sq. ft....	94½	148	148	128
Cost	$931.00	$698.72	$1,396.60	$1,204.00
Difference in cost, after deducting additional material, per cent	11	41		

are equally effective, which they are not, and the waste gas entering at 2400 deg. Fahr., and leaving at 1200 deg., which for our purpose is a decrease of one-half the entering volume. With a velocity of 400 ft. per min. in the upper section of a regenerator the same flue area at the base of the regenerator would permit a velocity of 200 ft. per min. or an average velocity through the chamber of 300 ft. per min.

Where the checker chamber is 12 ft. deep, the period of time required for the gas to pass through the checkers would be 2.4 sec. If the initial velocity were increased to 600 ft. per min. under the same conditions, the average velocity through the checkers would be 450 ft. per min., in which case the required time for the gas to pass through the checker work would be 1.6 sec. In view of the fact that all passes in a checker chamber are not effective, it is not difficult to imagine a condition wherein the time element would be reduced to such an extent that the temperature drop or heat absorption would be extremely small. The importance of having a proper flue area cannot be emphasized too strongly.

On the other hand, when the chamber is used as a recuperator, the passages must present sufficient resistance to allow a proper element of time for heat absorption. If the flues were too large and open, air would pass through too rapidly, as each degree rise in the temperature in the air increases the velocity. This is the condition which prevails in straight vertical flue designs, wherein the velocity of the incoming air is too great for proper heat absorption.

Providing a Constant Flow of Air

To produce an even flow of air to the furnace it is necessary to provide a reserve space above the checkers, in which the kinetic energy of the many streams of air flowing through the checkers may be converted into static pressure, with ample volume to guarantee a constant and even flow to the uptakes. This is just

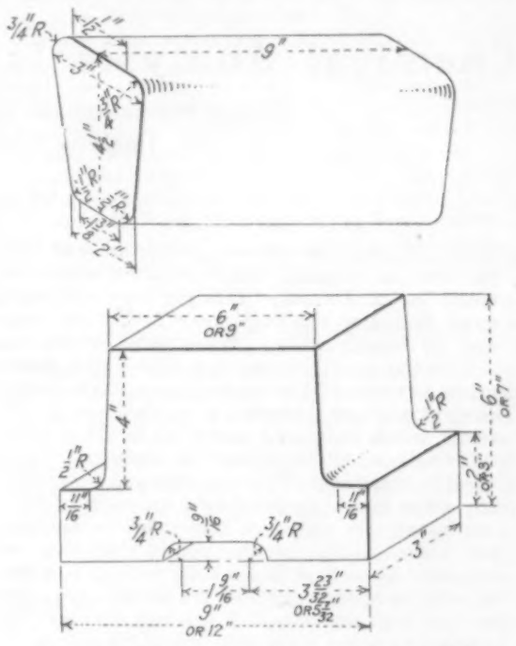


Fig. 2—Stream-Line Block (Top) of Uniform Size, Regardless of the Dimensions of the Wall Block (Bottom). The two sizes of the latter, 12x7x3 in. and 9x6x3 in., are responsible for the fact that five of the dimensions shown in the drawing are given two values each

as essential as a supply or reserve tank is on a compressed air system.

Furnaces ranging from 75 to 150 tons require approximately 65 cu. ft. of free air per min. per ton of capacity. The reserve space should not be less than one-fifth the total volume of free air required per min. This will allow a complete change of air above the checkers every 12 sec., which will provide ample time to eliminate pulsations and the like. The reserve space expressed with reference to furnace capacity is approximately 12 3/4 cu. ft. per ton.

Suggestions for Increasing Capacity

Fig. 1 gives an arrangement of checkers made up from a series of straight vertical flues. This particular construction does not depend on the area exposed to lateral or longitudinal flues. Each passage of this checker design has a positive circulation, owing to its method of construction. The loss of surface due to accumulated dirt does not exceed 10 per cent of the total exposed surface, which permits a better working checker, with a longer campaign. The streams of gas are divided at each course of block, to permit the entire column to scrub the checker surface, which is essential for good heat transfer, owing to the low conductivity of the gases.

By forming the checkers in this manner a substantial increase in checker weight and exposed area may be obtained, together with an increase in flue capacity. The increases over present methods are shown in the table.

The stream line blocks, which are the hot working elements, have approximately twice the exposed area per sq. ft. of the walls which support the blocks. Due

to the fact that the blocks support no weight other than their own, this is possible, while the walls which support the load can be given the proper strength to meet the requirements at a high temperature. These blocks have a comparatively low resistance to the outgoing gases and offer a slightly added resistance to the inflowing air or gas, which will counteract the high velocity obtained in a straight vertical flue, in which we do not have the proper element of time, with the comparatively large passages, for the proper transfer of heat.

The two arrangements will accommodate most of the present cases in which furnaces are operating with small regenerators. The 6 x 9-in. flue is designed to meet the requirements of chambers which have a small cross sectional area and are badly in need of flue capacity. The larger flue is suggested also for use in liquid fuel furnaces, where the atomization is done by means of steam. In this regard the moisture is carried into the checker and causes the unconsumed carbon and other substances to accumulate more rapidly than in other practice.

Chemical Analysis Is Poor Index of Quality

Carbon Formations of Pig Iron Are Carried Through Melting Furnace into Casting

BY E. J. LOWRY*

CHEMICAL analyses are but guideposts, and each pig iron has a quality all its own. Who has not heard the melter say, "This pig iron will carry more scrap than that one over there"? Yet the analyses may be exactly alike. What then carries the scrap? It is the quality of the iron base which makes up about 94 per cent of the mass of iron. The present purchasing of pig iron, however, is on the basis of silicon content, which ordinarily makes up but 2 to 3 per cent of the volume. What a peculiar position to be in when buying something. It is not believed that there are many other materials purchased accordingly.

As an instance of this, look back over the analyses of bygone years. Glance at the old cold blast charcoal iron analysis. There you find a total carbon of about 3.65 per cent, as against some of the present hot blast coke irons with an analysis of 4 per cent carbon. We find, however, that the cold blast iron carried from 15 to 25 per cent more scrap than the present-day coke irons, and the amazing part of it all is that the silicon in the castings was lower. The castings machined just as readily at equal speeds and feeds as the present-day castings, and they were stronger and better. What caused this to happen, if it wasn't the quality of the iron matrix? It surely could not have been the silicon, nor any of the other elements, because the silicon was lower and the carbon was lower. If you should go into the rest of the analysis, you would find the phosphorus higher, so much so that the foundryman of today as well as the metallurgist would say that solid castings could not be produced, but they were.

There is a difference between coke iron and charcoal iron. The quality of the castings made from charcoal iron is appreciably better than of those made from coke iron. Why, then, isn't charcoal iron used? Solely because of the price.

Charcoal iron is made under an acid slag, whereas the coke irons are usually made under basic slags. The more nearly the coke iron furnace operates on an acid slag, the more nearly the quality approaches charcoal iron. The acid slag tends to give a different reaction to the smelting of the ores and to give a different carbon formation in the resulting pig iron. These carbon formations persist through the melting operation into the casting. The carbon formations in the pig iron influence the resulting matrix in the casting, producing what resembles pearlite when the temperature of pouring, rate of solidification and other factors are in balance.

From such a combination castings are produced which give the greatest machinability, the longest wear and the least expansion or growth. No matter what the field of castings, these quality elements are essential. The automobile cylinder maker is confronted with the problem of machinability, wear and expansion. The same is true in piston ring manufacture, but in these two groups different irons are used and different analyses enter the castings. The result is that high grade engines often give trouble because one part or another wears out. When the block is dismantled, it is found that wear on the piston ring has been greater than that on the block or vice versa. If the wear had been equal, the longevity of the engine would have been increased.

The machine tool builder is confronted with the problem of warping and growth. He tries to "age" his castings to overcome this, but if he would pay more for his pig iron or other raw materials, he would find he could prevent growth and warping without carrying a large stock of castings. The interest charges on his present large inventory would be cut down and would aid in offsetting the increased price of quality materials.

The great trouble with the foundry industry today is that because of price the melter is required to use a pig iron which is sometimes unsuitable for his casting work.

If we could melt our present furnaces at temperatures hot enough to destroy the inherent qualities of pig iron, we would then become successful in employing a large percentage of tramp materials and make castings which would be surprising in their strength and other physical properties. These temperatures would range from 2800 to 3000 deg. Fahr., depending upon the materials under consideration. The German investigator, Piwowarsky, has shown this to be the case. He sets forth claims that at such temperatures he destroys the "germs" which are inherent in pig iron and scrap, and for which we cannot inoculate our irons to prevent their ill effects.

*Metallurgist Hickman, Williams & Co. and Witherbee-Sherman Co., New York. Abstract of address before National Association of Purchasing Agents at Grand Rapids, Mich., June 7.

Philadelphia Steel Treaters Elect Officers

The Philadelphia Chapter of the American Society for Steel Treating at the meeting held June 2, at the plant of the Henry Disston Sons, Inc., announced the election of the following officers for the year 1927 and 1928: Chairman, James R. Adams, superintendent of special production department the Midvale Co.; vice-chairman, Dr. R. H. Patch, assistant to the president, E. F. Houghten & Co.; secretary-treasurer, A. W. F. Green, sales metallurgist the John Illingworth Steel Co.; directors: A. L. Collins, sales metallurgist Horace T. Potts Co.; W. B. Coleman, W. B. Coleman Co.; E. H. Barker, production and maintenance engineer A. H. Wirz Co., Inc.; H. B. Allen, metallurgist Henry Disston & Sons, Inc., and R. C. Gebert, metallurgist the Nice Ball-Bearing Co.

The chapter year book for 1927 is being edited by Charles Willits, sales manager for the Philadelphia district, Central Alloy Steel Corporation. It will be a pleasure to forward copies to any who may wish them if they will send their request to the secretary.

Rough Sheet and Tin Mill Rolls

"Tuesday Roughness" Explained as Due to "Crazing" of the Roll's Surface—Cause and Remedies

BY WALTER R. KNEELAND*

FOR some time past sheet and tin mills have been bothered with short raised streaks on either the top or bottom of the pack. These begin to develop about the third turn after starting up and continue until the fifth or sixth turn. They range in size from about 1/32 in. in width and height and about ¼ in. long, up to 1 in. long if the streaks connect. These ridges parallel one another from ⅛ in. to 3/16 in. apart running lengthwise of the pack. They are more pronounced through its center and cover about two-thirds of its area. A pack may be so affected in a solid patch, or the patch may have one or several clean streaks, either narrow or quite wide, running through it. This condition, which lasts through the day turns on Tuesday, and then disappears completely, has become known as "Tuesday roughness."

While the description illustrates the maximum condition, it exists to a less extent in many cases, and is mistaken by operators as gathering, or the embedding of scale in the roll surface. On the appearance of this condition, operators have resorted to the use of the scouring block, or in some cases have replaced the rolls. But the condition is entirely due to "crazing" of the roll's surface, which is the basic cause of roughness in hot rolling. Crazing is due to the following condition:

Uneven Expansion and Contraction

Cast iron when heated for the first time reaches a greater expansion than during any subsequent reheating, due to the fact that, on contracting, it does not shrink to its original dimensions. This is true for the first few times it is heated, when it reaches a permanent set, and then contracts to about the same dimensions as before reheating. When a chilled roll has been heated and expanded and then the heat has been withdrawn, or the amount of heat applied has been reduced, as during the rolling of the finishing passes, the surface begins to lose heat by radiation and contraction sets in.

It is impossible for the surface to contract against metal still expanded beneath it. Hence, when radiation from the surface is faster than the conductivity of the metal beneath it, the chilled surface, which has little or no elasticity, has to fracture and separate to give relief and to cover the greater area of the metal beneath it. The depth of fracture will be enough to reach this metal, which is still expanded, generally from ⅛ in. to 3/16 in., and, of course, the number and size of fractures depend on the temperature of the roll and the rapidity of radiation.

Circumferential contraction causes fractures running lengthwise of the body, and longitudinal contraction causes fractures running around the body. Thus the crazing takes more or less of a cubic shape. It can be seen on old rolls while being dressed in the roll lathe. On account of the greater expansion, if new rolls are not brought to so high a tempertaure they will not be so badly crazed and will carry a better surface throughout their life, as can be seen from what follows.

How the Condition Is Produced

When a crazed roll is put in service and heat is applied to its surface, the surface metal is the first to expand. Being held by the unexpanded metal beneath it is expanding against itself, and thus put under local compression. This condition exists until enough heat has reached the center, when the entire roll begins to expand. At this point compression of the surface is relieved and, the surface areas being elongated by the expansion taking place at the center, the crazed cracks will be opened up and remain as fissures in the surface if the heat applied is not sufficient to expand the surface in keeping with the center.

During this stretching stage the additional heat applied during a roughing period will be reaching the center and causing its further expansion, while the finishing passes are being rolled at a less temperature. This, combined with radiation from the surface, can be sufficient to retard or stop surface expansion. It is an exaggerated form of this condition that is responsible for the so-termed "Tuesday roughness," the fractures running around the roll being opened sufficiently to allow the metal of the pack to be pressed down into them. They thus leave their pattern on the face of the pack in little raised ridges of steel.

Cracks Parallel to Axis Do Not Open

The cracks running lengthwise of the roll must also open in the same manner and in an equal proportion to the circumferential stretch, but their surface is kept closed by the rolling motion across them, flowing the adjoining metal of the roll's surface together. Their presence is never shown on the pack, and in this connection all types of roughness are lengthwise with the pack.

The use of the scouring block to correct this condition is useless, as there is nothing on the roll's surface to be removed. The remedy is shown by the fact that the roughness is never found in line with the ears on the pack; here the pressure is greater and is sufficient to close the opening by flowing the metal in from the sides. Of course, the crazing will not be so heavy on this portion of the roll as in the center, but the clean strips through the center of the patch also show that greater pressure, due to a high place in the roll, has acted in the same way where the condition is most pronounced.

Applying the Remedy

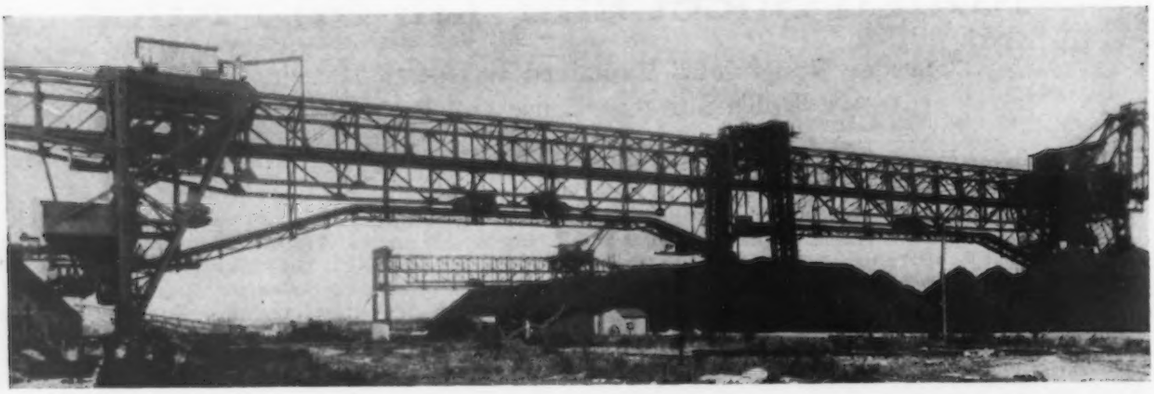
A simple method of counteracting the effect of this condition would be to roll short bars and apply pressure to the surface so affected. The fractures would be closed for a time and the face of roll would be as a solid sheet. Later, as fractures were reopened by further elongation, the method could be repeated. In addition to the pressure, would be the heat added to the center, which would make the roll a little fuller and be of far more benefit. It is evident that a roll so affected has been turned too hollow for its length, but if it is necessary or desirable to maintain the cross section used, the rolling of narrow packs before, or distributed through, the finishing passes will reduce the roughness to a minimum. If carried far enough, this will eliminate the trouble entirely, as happens of its own accord when the roll is fully expanded.

All other questions of roughing, gathering, etc., are traceable to the same crazed condition. The roll, contracting during the rolling of the finishing passes, opens the crazing, and, as it is a friction-type mill, the top roll travels only about 94 per cent of the speed of the bottom roll. In a 28-in. mill this produces a slippage of at least 5 in. per revolution in the top roll. With poor lubrication and other unfavorable conditions this slippage is materially increased, so it is easy to see the various results with this combination.

A hot strip mill for the Cuyahoga Works of the American Steel & Wire Co., of 60,000 tons annual capacity, will be built by the Morgan Construction Co., Worcester, Mass.

*342 Ritchey Avenue, Pittsburgh.

Two Bridges in Register, With Third in Distance. Locked together, the two can traverse as one and either trolley can travel full length of both



Flexible Handling of Coal in Quantity

Interlocking Bridges Permit Long Conveyor Runs — Junction Tower Is Focus of System

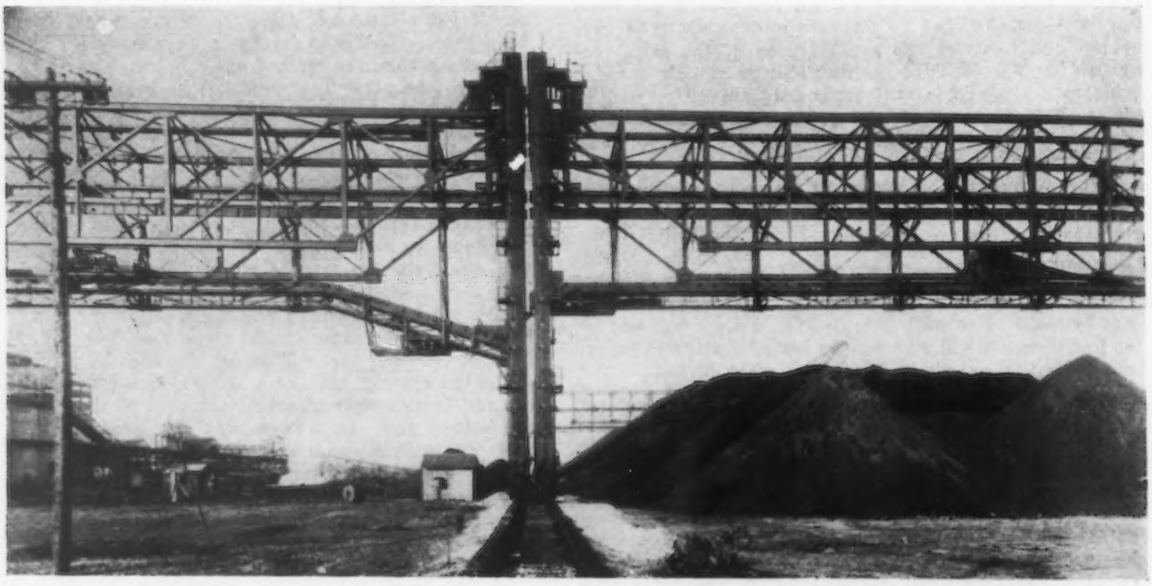
AFTER years of careful planning, the Consolidated Gas Co. of New York has completed and put into operation parts of its new plant at Hunt's Point. In keeping with the population it serves, this plant when completely finished will have a daily output of approximately 120,000,000 cu. ft. of gas.

Unique and interesting features have been developed by the Consolidated engineers for handling economically the coal and coke which comes into, goes through and is delivered from the plant. The equipment was built by the Brown Hoisting Machinery Co., Cleveland, and the Koppers Co., Pittsburgh; the Bartlett-Hayward Co., Baltimore, being the general contractor.

Incoming coal is unloaded from boats on the East River by two Brownhoist bridge unloaders equipped with 6-ton man trolleys and the guaranteed capacity of the bridges in unloading vessels has already been exceeded. A third bridge crane is provided directly behind the two unloaders, and running parallel with them. This bridge can be registered and connected up with either of the front bridges so as to make one unit of over 650 ft. in length, or it can be operated entirely independently of the other bridges. When two bridges are in register, the man trolley on either can pass through the length of both bridges and both bridges travel as one.

At present 1000 ft. of dock front has been completed, but property is available for approximately 1200 ft. more, giving an ultimate storage area under the bridge cranes of 2200 ft. in length by 482 ft. The front half of the dock, which is served by the two bridges, is for coal storage and the rear half, served by the third bridge, is chiefly for coke.

Each of the three bridges carries a 48-in. belt conveyor. The conveyors on the two front bridges travel in one direction and are equipped with weightometers for weighing the incoming coal. The belt on the rear bridge is reversible and does not have a weightometer. In the pier, or front leg, of each bridge is a receiving hopper with a capacity of 60 gross tons of coal. The hoppers on the front bridges are arranged to deliver coal either into transfer cars or to feed over a flight conveyor on to the belt conveyors on the bridges. The bridge conveyors are supplied with automatic trippers which deliver the coal into storage under the two front bridges. Or it may pass the length of the front bridge on to the belt on rear bridge, which also has an auto-

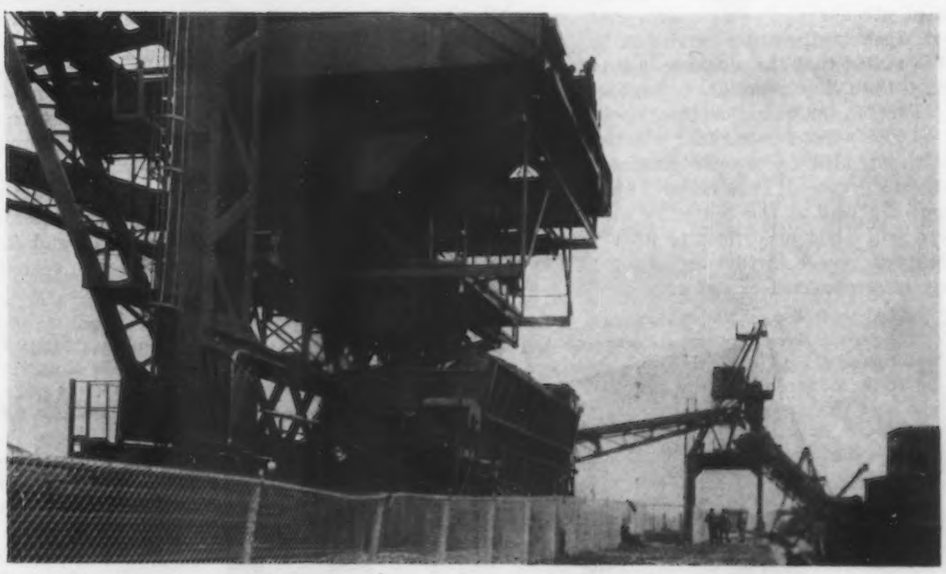


Detail of Registering Bridges Shown at Top of Page. Not only can the trolley travel through both bridges, but also the conveyor in front bridge (right) can discharge on to conveyor in rear bridge and thence to rear of that bridge

matic tripper for delivering coal into storage under that bridge.

Just back of the rear bridge and running at right angles to it is a 54-in. longitudinal belt conveyor on a trestle which extends the entire 1000-ft. length of the storage area. This conveyor, like the one on the rear bridge, is reversible and can be used to carry coal or coke from rear bridge to plant or, when both belts are reversed, to deliver coke to storage under the bridge.

Incoming coal which is to go direct to the gas plant rather than to storage is unloaded from vessel by the bridge unloaders and delivered into transfer cars, as mentioned above. These cars, operating along the front of the storage area, carry the coal to a multiple plate feeder which delivers it to a transverse belt conveyor and this, in turn, carries it back 500 ft. toward the plant.



(Above) Pier of Front Bridge, Showing Man-Trolley and Receiving Hopper with Electrically Operated Gate for Discharge to Transfer Car. This gate is controlled by operator of transfer car

(Right) In Rear Is the Boom-Equipped Loading Tower on Dock Front for Delivering Coke to Barges. Bridge hopper and coal transfer car are shown in foreground

Alongside of this transverse coal belt is a similar unit of equal length to convey coke coming either from the plant or from storage to a loading tower on the dock front. This tower is equipped with a loading boom which lowers into the barges and delivers the coke with little breakage.

A junction tower is located at the rear of the dock. Into this lead the longitudinal belt, both transverse belts and an extensive system of coal and coke belts which connect the tower with the gas plant. Through this tower passes all of the coal going into the plant, all of the coke going from it and all of the coke going from storage to the plant or to the loading tower.

A novel feature of these conveyors is an electrical interlocking control, operated from one central tower, which regulates the starting and stopping of the several thousand feet of belts and prevents one belt from flooding the one next to it when starting or stopping.

Another interesting feature is found on the transverse belts. As it is planned to extend the storage area past them, the belt ends are provided with power-operated rams to draw them back out of the path of the bridge supports as they pass, and the belts are depressed to run under the center runway tracks.

Lower Production and Shipments of Malleable Castings

Production of malleable castings in May is reported by the Department of Commerce at 57,655 tons, which is the lowest figure since that for February. It compares with 59,225 tons in April and with 60,128 tons in May of last year. All figures are from 134 identical plants. For the five elapsed months of the year, production in 1927 was 292,124 tons, or 15 per cent below the 343,440 tons produced a year ago.

Shipments in May likewise were the lowest since February, having been close to production at 57,269 tons. This compares with 60,470 tons in April and with 59,151 tons in May last year. While shipments for the five months have been 2 per cent less than production, they were only 9 per cent under last year, compared with 15 per cent drop in production. Shipments in five months were 286,374 tons this year and 314,485 tons last year.

Orders booked are reported at 49,482 tons in May, the lowest figure since last December. There was a sharp reduction from the 56,326 tons of April, but the figure was about the same as that for May last year, which stood at 49,179 tons. Orders booked have run consistently below shipments and production in the first five months of each of the two years. It is estimated that the percentage of capacity operated in May was 54.1, and for the five months 55.2, compared with 62.3 for the five months a year ago.

Facts About Asphalt

The American Asphalt Paint Co., 844 Rush Street, Chicago, manufacturer of asphalt preservative paints, has published for general distribution a booklet entitled "Asphalt Through the Ages," which gives a great deal of information about asphalt and its history. It is stated that asphalt was in use 10,000 years before the dawn of Christianity and ages before the building of ancient Rome; back in the days of the ancient Sumerians, Assyrians, Persians, and Egyptians they were waterproofing their boats, roofs and castle walls with it; the Egyptians used it to preserve their famous mummies. The booklet is handsomely printed and illustrated.

Machine for Making Wire Fencing

Line Wires of Extended Coiled Spring Form Employed and Ring Lock Used at Intersections—Machine Is Continuous in Operation

ADVANTAGES of the product, as well as the machine itself, are stressed in connection with the automatic single-operation fence machine here illustrated, which is being marketed by Arthur Blashill, 501 Fifth Avenue, New York. Machines of this design have been in commercial operation in Canada for three years but the present model incorporates, it is said, improved features evolved during that time.

The machine is intended for the manufacture of field and railroad square-mesh fencing of ring-lock type from wire of the usual gages up to and including No. 9, and in the standard range of spacings, number of line wires, heights, etc. Two widths of fence, up to 48 in. each, may be made simultaneously. Features claimed for the fencing produced on the machine include unusual resilience, strong support because of the vertically placed ring-lock employed, and uninjured galvanized coating. Improvements intended to increase production and lower costs of manufacture are also emphasized.

Continuous vertical wire feed and margin twisters, continuous line wire coilers, continuous measuring devices and windup, or means of bundling, are features of the machine. Reciprocating parts employed have short strokes and weigh less than one-half ton, the principal strains being carried in tension by draw bars. It is stated that the machine is capable of even greater speed than it is practical to handle the supply of wire.

The fencing made on this machine is of galvanized steel line wires formed into a series of extended spiral coils, intended to provide maximum resilience in the finished product. It is claimed that, upon the application of a load at the center of a span, fencing of this type will yield or deflect to an unusual extent. This ability to recede farther on impact and to return properly is emphasized as not only checking a shock gradually, but as furnishing the condition whereby the wires receive far less strain.

Another feature of the fencing is the ring lock, by which the vertical and intermediate line wires are secured. This lock, shown in Fig. 2, is made of material of the same gage as the vertical and the line wires and is arranged so that the center or head comes at the top. In addition to its locking of the wire in all four directions, an advantage claimed for this type of lock is that it does not hold moisture, and thereby eliminates a common cause of corrosion.

A general view of the machine as it appears from the operator's position is shown in Fig. 1. This view also shows the measuring and winding or bundling device at the rear, from which the rolls of finished fencing are removed. Fig. 3 pictures one of the "actions" of the machine, the number of which corresponds to the number of intermediate line wires in the fencing being made. These "actions" are employed in making the ring lock by which the intersections of the vertical and horizontal line wires are secured. In this operation the lock wire, *A*, is fed from the original coil, cut to suitable length and formed into a staple by the slide, *B*. This slide fully shrouds the staple while it is being driven, by the inside driver, into the pair of dies that in proper sequence are clamped by the "action" die slide on the line and vertical wires. Having the staples formed from the wire and controlled in their position for entering into the die is claimed to obviate malformation or missing of locks, thus eliminating loss of time for rectifications.

The arrangement of the "actions" and also of the two draw bars, with spaced holes, that operate slide *B*, Fig. 3, may be noted at *A* and *B*, respectively, Fig. 4. The staple driver rods are located on the underside of the draw bars. The vertical or stay wire feed control,

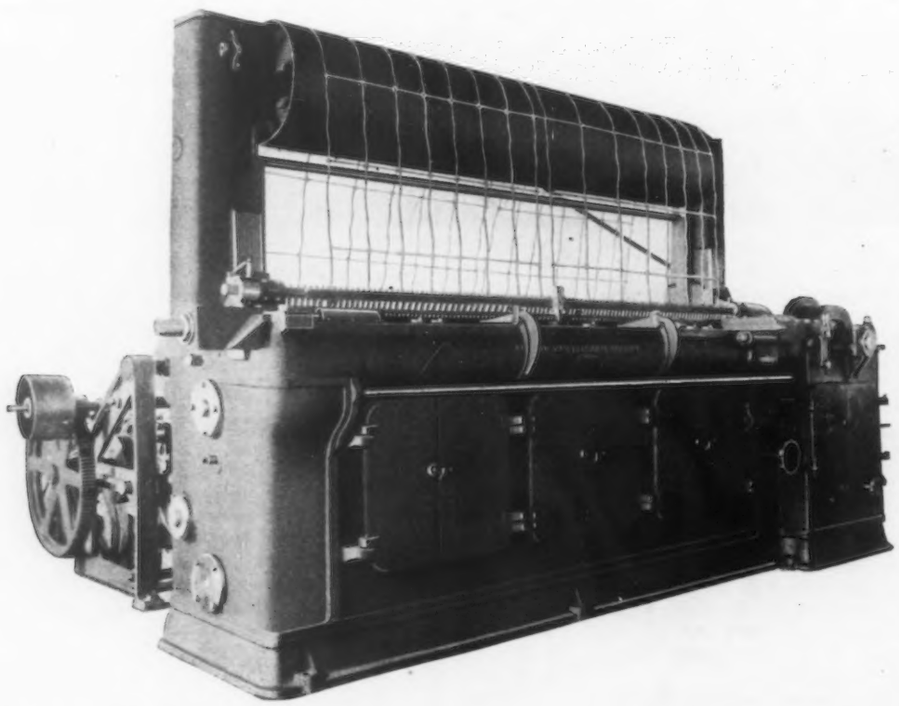
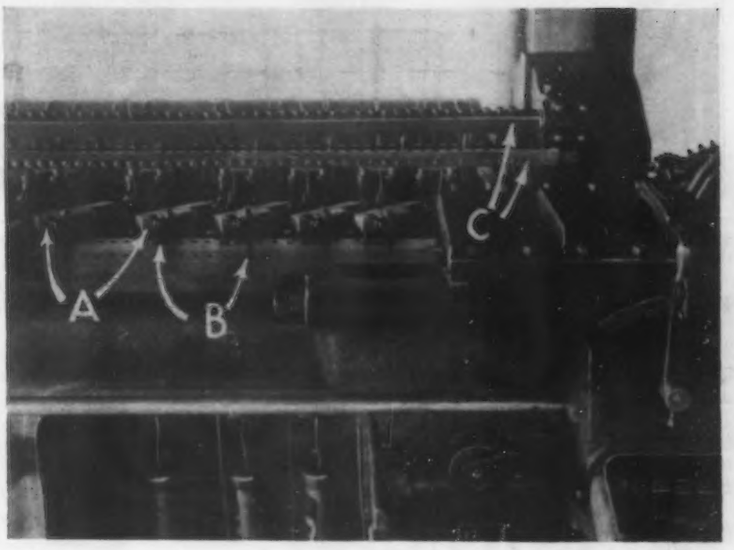


Fig. 1 (at left)—Continuous Vertical Wire Feed and Margin Twisters and Continuous Line Wire Coilers Are Among the Features

Fig. 2 (above)—Ring Lock by Which Vertical and Intermediate Line Wires Are Secured

Fig. 3 (at right)—The "Actions" Are Employed in Making the Ring Locks Shown in Fig. 2

Fig. 4 (below)—The Vertical or Stay Wire Feed Control Is Shown Raised Above Its Working Position



C, raised somewhat above its working position, is another important member shown in Fig. 4. It is stated that, by means of this feed control and its auxiliary parts, the usual straightener is eliminated, and slippage on the wire during cut-off periods is also prevented. It is claimed that injury to the galvanizing, frequently caused by the usual straightener and by slippage, is eliminated, and the galvanized coating is preserved, fencing of improved quality and longer life being produced.

Convenient Replacement

Machine tool standards are followed in the construction of the machine, the improved model of which has a one-piece frame. The slides, drivers, dies and other parts which work on the wires, are of simple form and may be replaced conveniently. The design of the individual self-contained lock-forming "actions" are stressed as eliminating difficulty in making and maintaining adjustment.

STOCK UTILIZATION

Committee Decides Fate of Accumulating Stores and Saves Capital Charges

BY JOHN F. HARDECKER

ONE of the more serious problems the average machinery manufacturer has to face is the stock problem. It is inevitable that, unless special precautions are taken, there will accumulate in stores a large and varied group of spare and special parts and materials. From the viewpoint of the stockman, these are generally retained, for while the machine for which they are used may be obsolete or obsolescent, he judges from his experience, which is—in essence—that anything may be called for some time. In fact, when questioned, he probably can cite instances in which material has been called for after many years in stores without an issue—material that was obviously "dead." So he'll say "Hold it."

But this ever growing accumulation of stock costs real money to maintain, taking up valuable floor space and requiring expensive records. It is also dangerous in that it lends a false value to "assets" when figured on its book value (actual cost of production).

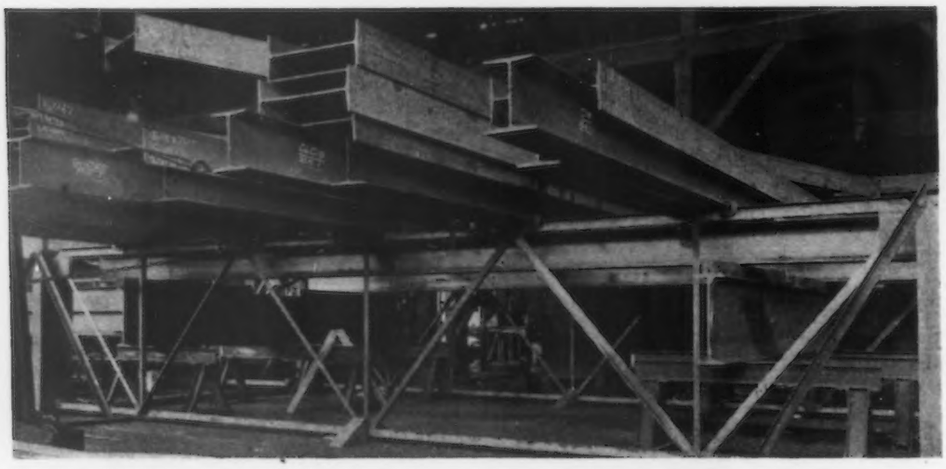
One large manufacturer has evolved an efficient system for keeping down this accumulation of materials and parts. He has in his organization a stock utilization committee constituted as follows: a representative of the purchasing department, familiar with market values; a representative of the sales department, familiar with selling demands; a representative of the planning department, familiar with shop requirements, and a representative of the engineering department, familiar with engineering standards and specifications.

This committee, meeting semi-monthly, has submitted to it, for consideration and recommendations, data and samples of all parts and materials which have shown no appreciable movement in the past six months, or whose movements have not exceeded 10 per cent of the stock on hand. The committee may recommend (1) holding the stock in anticipation of increased demand, due to conditions with which one member is familiar; (2) sale of the stock in whole or part, as excess; (3) modification of the obsolete or obsolescent part to a part used in current design; (4) holding it if the quantity is sufficiently large to warrent the engineering department specifying it in a current or future design; (5) substituting it in a current design until exhausted; (6) scrapping it as junk, if the part has no sale value as such or (7) using it in maintenance work about the plant.

It is really remarkable how much floor space has been released for production purposes since this system was installed. Even greater, in its usefulness to the organization, has been the release of money tied up indefinitely in stock of questionable value. It also reflects a better business viewpoint, as losses, when they do occur, are taken quickly and not put off against an inevitable day in the future.

Pictorial Story of River Transportation of Steel and Oil

"Our Runaway Rivers—Put Them to Work," is the title of a 52-page book with 60 photographic illustrations of shipping activities on the inland waterways, which has just been issued by the Jones & Laughlin Steel Corporation, Pittsburgh. The introduction calls attention to the fact that the disastrous floods in the Mississippi Valley have stimulated a national determination to make the rivers go to work furnishing transportation, power and light to the large population in the Valley States, instead of working havoc at will. The illustrations show how the products of the steel mills in Pittsburgh are transported by river to Southern and Western ports and distributed far inland by rail, how the oil companies are hauling their products from their Southern refineries into the North and Northwest for similar inland distribution, what the Government barge line is accomplishing and how various private carriers are beginning to spring up and flourish as distributers of agricultural and manufactured products. The book is being mailed to anyone requesting it.



Actual Tests Were Made of Two of the Welded Trusses, Structural Shapes Being Used to Make Up a Concentrated Load of 40 Lb. per Sq. Ft.

WELDS STRUCTURAL MEMBERS

Pacific Coast Fabricator Employs Electric Arc Process in Trusses and Other Work

ECONOMIES resulting from the use of electric arc welding in the fabricating of roof trusses by the Pacific Rolling Mills Co., San Francisco, are outlined in the following, which is taken from data submitted by R. W. Beard, welding engineer, of the General Electric Co., San Francisco.

In addition to the fabrication of trusses, the Pacific Rolling Mills Co., which has been active in the structural field for more than 50 years, employs the electric arc process in the construction of all-welded crane cabs, gantry crane trucks and in the repair of special punches and press tools. The progress being made at this plant in the application of welding is the result of careful and conservative engineering, states Mr. Beard. Test specimens are made and pulled to determine strengths; welds are made under close supervision and are inspected.

One of the reports of the Pacific company of tests of a welded truss, 52 of which are said to have been fabricated with savings in drafting room time and in construction, is quoted by Mr. Beard as follows:

"The truss was designed in the regular way, except that the area of the rivet holes was not deducted. This was our first advantage. Detailing was merely a billing of plain sheared angles and two square gusset plates for the connection to the columns, as all the other gusset plates were omitted. We soon found more labor, material and time saving as the work progressed. Top and bottom chords were laid into a horizontal jig, which was marked for the panel points of the truss to facilitate accurate spacing of the diagonals. Since the latter are single members, we welded one-half of their number on the face of this layout, turned the half complete structure on the already welded side and placed the remaining diagonals on this other face of the truss. After these were securely welded to the chords we attached the end connections and fastened the heels of the top and bottom chords with welds near their panel points and in places where stitch rivets would ordinarily be required in riveted trusses.

"The lengths of the welds on each member were carefully calculated according to the size of the material, and results obtained through previous experiments on test specimens.

"Two such welded trusses, spaced 14 ft. apart, and bolted to columns, were used in the actual test. The load consisted of heavy 26-in. I-beams and other shapes to make up the required concentrated load of 40 lb. per sq. ft. for which the truss was designed. The trusses, which were 5 ft. 6 in. deep and had a span of 30 ft., were inspected thoroughly and showed a deflection of ¼ in. at the center. We then increased the load until finally 150 per cent of safe load, or 60 lb. per sq. ft., was applied. This approached very close to the elastic limit. A rigid inspection, such as pounding on the welds, etc., revealed no trace of weakness in the welds nor in the truss members, and measurement indicated only ½-in. vertical deflection of the whole structure, which in our opinion is a sign of a much stiffer connection of the diagonals to the chords than is ordinarily obtained."

Five-Ton Cranes Also Arc Welded

The report goes on to state that "after removing the loads, the truss regained its original state. We may safely say that the welding of steel structures is by no means a thing of the far future, for we are well recompensed by the savings effected by using the present structural shapes." The use of these shapes, although they are not designed for economical welding, has well repaid the company, which hopes to see this branch of the industry advance steadily, states Mr. Beard.

In connection with an arc-welded 5-ton crane, recently completed, a saving of one and one-half days in the drafting room work alone is claimed. Examples of other savings due to the use of welding at this plant include the fastening of the cross carriage tracks to the main carriage I-beams. Previous to the introduction of welding, these rails were fastened in position by clips, but they are now welded in position at less cost than by the previous method. The company employs General Electric Co. type WD-12 single-operator welding equipment.

Core Baking by Electric Heat

Description with illustrations of a series of electrically heated core ovens is made in a publication of the Edison Electric Illuminating Co., Boston. These ovens are used for cores varying from less than an ounce to as much as 400 lb. each, required in making intricate castings used in the manufacture of laundry machinery.

Two large ovens are of the car type, with capacity for a charge of about 24,000 lb., including weight of car. With this charge, each kwhr. bakes about 15 lb. of cores. Six ovens somewhat smaller are of the truck type, handling many of the larger cores, the trucks being charged into the oven by an electric tractor. Two smaller ovens are of the rack type, the cores being placed on individual racks, which then are placed in the oven and take the form of shelves along the walls.

Each oven is heated by several banks of ribbon resistor units mounted on the side walls and in a pit beneath. Each side wall and the pit supply about one-third the heat. Each unit is rated at 3.8 kw. on 110 volts. The necessary heating capacity of each oven is obtained by installing the required number of units.

Temperature controls and electric contact regulators are used during the process. The control is said to be within 5 deg. Fahr., current being turned on or off according as the temperature drops below or goes above the set point. The time regulator can be set for any desired length of baking period. The heat may be turned on at any designated time in the future, the operation being entirely automatic, both as to turning on and turning off.

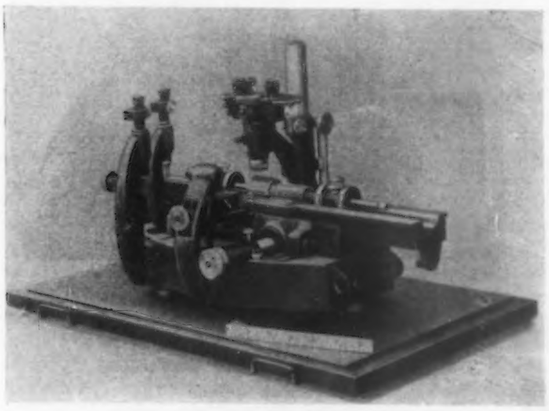
New Zeiss Universal Measuring Microscope

A new Carl Zeiss universal measuring microscope for checking within closest possible limits all dimensions of a screw thread, including the correct pitch diameter, by the knife edge method in the plane of axis, has been placed on the American market by the George Scherr Co., 142 Liberty Street, New York.

The instrument may be used also for checking and measuring thread profiles against dial templets, and for measurement of divisions, jigs, gages, etc. It may be employed also in connection with the spotting of drill jigs.

To provide the utmost degree of precision in this instrument no screws are depended upon for measuring, but accurate glass scales in combination with a novel type of spiral ocular are used. All measurements are absolute, without reference to standards or gage blocks. The readings both for the cross and the longitudinal movement are each obtained in one single ocular. From line to line on the scale is 1/20,000 of an inch, and these spacings are so far apart that the eye can readily subdivide them into 1/100,000 of an inch.

The general construction of the instrument may be noted from the accompanying illustration. On a massive bed with column is arranged a cross carriage which floats in both directions on balls. The two carriages run at exactly right angles to each other. For observing the travel of each, separate microscopes are provided. The cross movement serves for measuring the diameters, the longitudinal movement for the lead. Each carriage has both coarse and fine adjustment, and each glass scale has independent adjustment.



The Instrument Is Intended for Checking All Dimensions of a Screw Thread

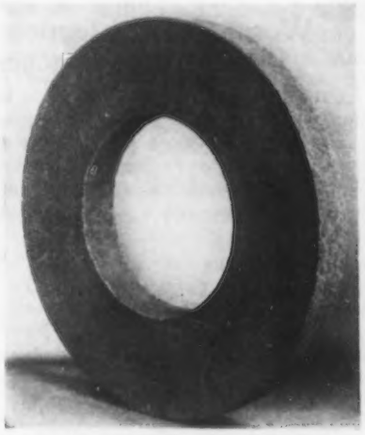
Angular measurements are obtained with the universal protractor eye-piece or the revolving dial templet. Ordinarily, the instrument is equipped with a duplex microscope in the bracket. The left hand ocular is the protractor eye-piece, containing a templet with five parallel hair lines for measuring. The right hand ocular is equipped with the revolving dial templet containing the contours of the standard U. S. and Whitworth thread, against which the form of the thread can be checked. The microscope bracket can be swung around the column exactly 90 deg. against a stop, and thereby a spotting attachment is brought into line with the optical axis. In connection with this arrangement and using an auxiliary flat table, the instrument is very handy for laying out jigs and similar work. The top of the table is of glass and arranged to swivel to facilitate the lining up of work with the templet in the ocular. This flat table is likewise required for any flat work such as chasers, threading tools, etc., that cannot be taken between centers or laid on the V-blocks.

The universal measuring microscope is furnished with three different types of equipment. It is available as screw thread comparator; as large toolmakers' microscope; or as complete universal measuring microscope. The instrument will measure pitch diameters up to 2 in., and lead up to 8 in. The largest distance between centers is 28 in. and the maximum distance under microscope is 5 in.

Snagging Wheel for High-Speed Operation

A new grinding wheel for snagging, employing Bakelite as the bonding material and designed especially for high-speed operation (9000 surface ft. per min.), has been brought out by the Norton Co., Worcester.

The use of Bakelite is said to result in a wheel with the open structure of a vitrified wheel but which can be operated with equal safety at the higher speeds. Another advantage of the Bakelite bond is that it is not affected by heat. A considerable increase in production, both per unit of time and per unit of abrasive, is the natural result of the high-speed operation.

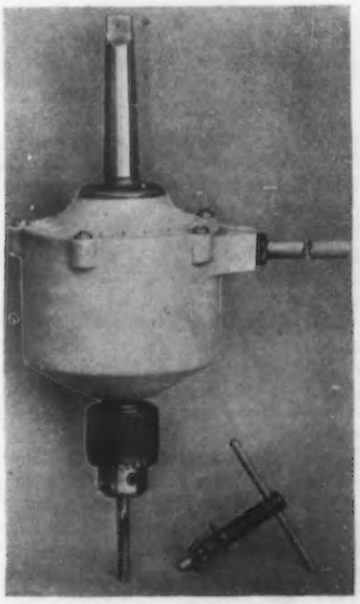


Bakelite Is Employed as the Bonding Material. The wheel may be operated at 9000 ft. per min.

High-Speed Tapping Attachment

A new high-speed tapping attachment for driving taps up to ¼ in. in steel and up to 5/16 in. in cast iron has been added to the line of William L. Procunier, 18 South Clinton Street, Chicago.

The housing of the attachment is made up of an aluminum body and cover held in position by five screws as shown. A Morse taper shank is threaded to fit in the drive shell within the housing, this shell being also threaded in the lower end to receive an internal gear. The internal gear meshes with three intermediate spur gears, which engage with the reverse gear, thus producing, it is claimed, a balanced reversing mechanism.



Balanced Reversing Mechanism Is a Feature of the Attachment

The chuck is fastened to the spindle of the attachment by threads and the spindle is secured to a fiber cone clutch by means of a drive pin which is held in position by a lock pin. The necks of the upper drive shell and the reverse gear are mounted in phosphor

bronze bushings. The upper thrust is taken by a ball thrust bearing, and the lower thrust is taken by ball bearings, which roll on a steel plate having projections to support the shoulder studs. The intermediate gears rotate on three bronze thrust washers.

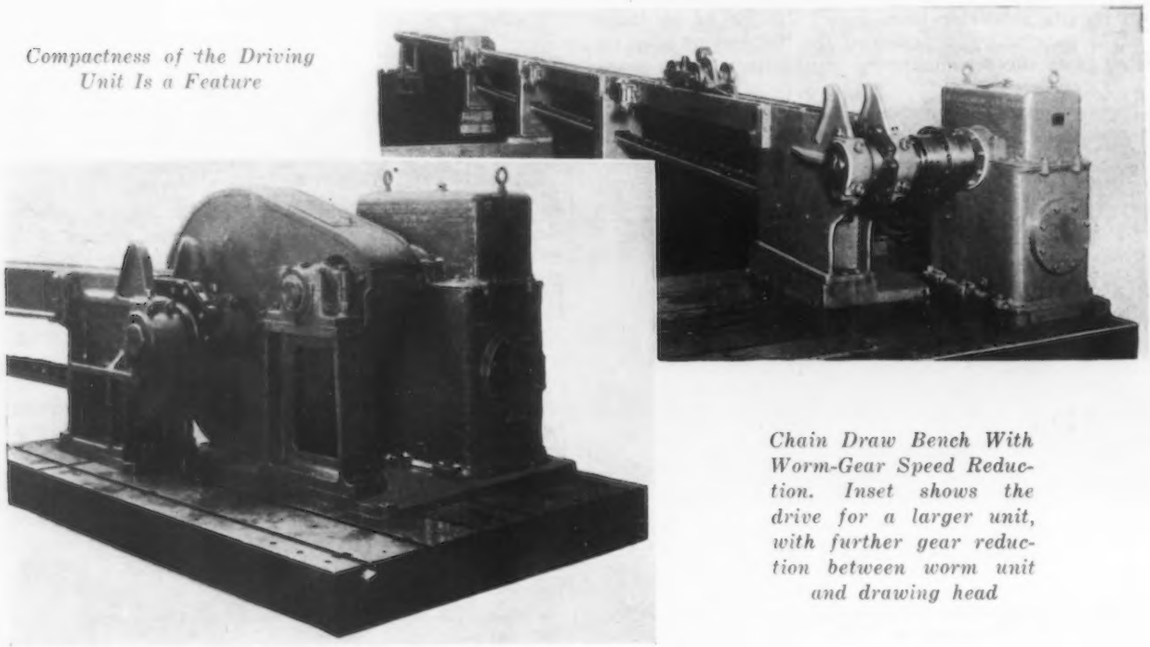
When tapping, the surface of the upper half of the fiber cone clutch is engaged with the conical surface of the drive shell. This thrust is taken direct on the drill press spindle when driving the tap forward. For reversing the tap, the drill press spindle is raised about 1/32 in. This disengages the upper half of the cone clutch from the drive shell and engages the lower half with the conical surface of the reverse shell, which rotates in the opposite direction at twice the tapping speed. When reversing the tap, pressure is applied on the gears only.

It is stated that bottom or blind tapping may be accomplished as easily as through tapping because the power may be regulated by the amount of pressure applied on the drill press spindle by the operator.

Worm-Gear Reduction for Chain Draw-Benches

Better finish on the work, due to minimized vibration, is an advantage claimed for worm-gear drive on chain draw-benches, a recent development brought out by the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. Further advantages are reported to be less noise and a more compact machine. These machines are built in six standard sizes, ranging from 6000 to 50,000 lb. pull, and when fully equipped may, it is said, be operated in most cases by one man.

Compactness of the Driving Unit Is a Feature



Chain Draw Bench With Worm-Gear Speed Reduction. Inset shows the drive for a larger unit, with further gear reduction between worm unit and drawing head

Direct flexible coupled connection between the worm-gear unit and the sprocket shaft is the construction used on benches of 6000 and 10,000 lb. pull capacity, as here shown. The motor, mostly hidden by the other driving parts in the illustration, is mounted on the same base plate with the worm-gear unit and sprocket end leg. It is of 20 hp. at 900 r.p.m., giving a chain speed of 125 ft. per min. in the 6000-lb. size and 90 ft. per min. in the 10,000-lb. size. The length of the 6000-lb. size is 35 ft. 7 in., with a width of 4 ft., while the weight without motor or accessories is 8275 lb. In the 10,000-lb. size the length is 37 ft. 10 in., with a width of 4 ft. 9 in., and a weight of 13,000 lb.

On the four larger sizes there is one reduction between the worm-gear unit and the bench, consisting of cut steel herringbone gears incased in a grease-tight guard. The worm-gear shaft and the sprocket shaft each extend to outboard bearings. The largest of these benches requires a 100-hp. motor at 900 r.p.m, which gives a chain speed of 75 ft. per min.; it is 49 ft. 9½ in. long, 7 ft. 10½ in. wide, and weighs 47,000 lb.

Tongs of the alligator type swivel on the front axle of the tongs carriage. They are linked to the rear axle, which carries a counterbalanced hook. When the hook is engaged with the chain at the start of the draw, the open tongs are closed by the pull of the chain and hook, through the links. Continuation of the pull traverses the front carriage and thus starts the draw. At the end of the draw the recoil, caused by sudden release of the load, lifts the hook and opens the tongs. The hooks are of heat-treated alloy steel and the jaws, which are dovetailed in the tongs, are of tool steel.

Other improvements in addition to the tongs include unloading devices, which consist of a series of automatically operated arms for supporting the rod or tube after it is released by the tongs, thus preventing its interference with the chain and providing an inclined support from which the work may be easily removed, or even may roll off by gravity.

For drawing tubes it is customary to equip these benches with an extension of sufficient length to accommodate the tube being drawn, and with means for supporting the mandrel or triblet over which the tube is drawn.

Preparation and Use of Lignite

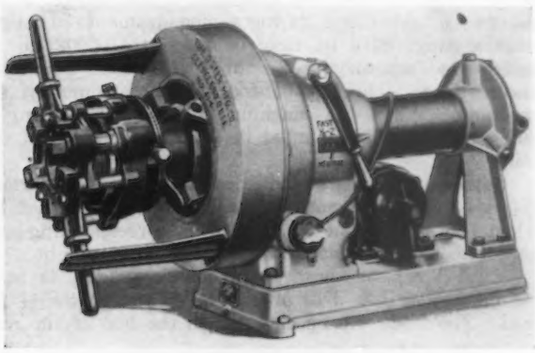
Bulletin 255 of the United States Bureau of Mines covers investigations of the preparation and use of lignite and requires more than 200 pages to tell this story. There are numerous illustrations, including both diagrams and reproductions of photographs. The work has been carried on under an act of Congress of Feb. 25, 1919. Copies of the booklet may be obtained at 50c. from the Superintendent of Documents, Government Printing Office, Washington.

In the summary, the need for the use of a benefited lignite as domestic fuel is pointed out. It is believed that a process which has been studied and developed is now suitable for commercial application. Yields of by-products are lower per ton than with coking coal and the quality of gas is lower. These low values make it impossible to handle much of the lignite in the Northwest at prices which would attract capital. Nevertheless this section is in need of a local fuel to replace coal hauled the length of the Great Lakes. European practice has been studied and comparisons are made between that practice and what is feasible in the United States.

Portable Pipe Threader for Material Up to 4-In. in Diameter

A 4-in. portable pipe threader, designated as the No. 414 Power Boy, has been added to the line of the Oster Mfg. Co., Cleveland, the new machine having been announced at a conference of the company's sales force held recently at the factory. The new product was developed to meet the demand for a machine larger than the company's 2-in. No. 412 Power Boy previously brought out, and is constructed of the same aluminum alloy as the previous machine. It weighs 380 lb.

The machine is driven by a ½-hp. universal motor which operates from any 110 or 115-volt lighting circuit, either direct current or alternating current, single-phase and of any cycle from 25 to 60. The motor is of a variable-speed type, which automatically speeds-up on the smaller sizes of pipe and holds the required speed on the larger sizes, but a two-speed transmission is also used to further increase production and power. A convenient gear shift lever on the side of the machine permits of making rapid changes of speeds.

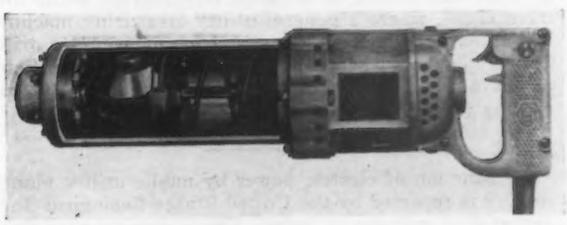


Pipe from ½ to 4 In. in Diameter Can Be Handled Through the Barrel

All sizes of pipe from ½-in. to 4-in. can be handled through the barrel of the machine, which will drive geared die stocks from 4½ in. to 12 in. by means of an auxiliary drive shaft. Any square end or roller type pipe cutter of 2-in. capacity can also be driven. The pipe is held staionary in a three-jaw self-centering chuck and the pipe tools are turned by the driving arms. Self-centering universal guides at the rear of the machine assist the front chuck in centering long lengths of pipe. The machine is 47 in. long, 20 in. wide, and 24¾ in. high.

Electric Hammer Strikes 2300 Blows Per Minute

The accompanying illustration shows the internal arrangement of an electric hammer which is being marketed by the Black & Decker Mfg. Co., Towson, Md. A universal motor, operating on direct current or alternating current from 25 to 60 cycles, is employed in the machine. The motor armature turns at approximately 10,500 r.p.m., and is equipped with an aluminum centrifugal fan which draws in air at the commutator end, passes it around the motor, and expels it through several ventilating holes in the field case opposite the fan. Automatically adjusted ball bearings are used on the armature shaft. The latter shaft is hollow to accommodate the spline shaft upon which the reciprocating hammer mechanism is mounted.



The Hammer Is Equipped With a Universal Motor. The working mechanism operates in a bath of oil

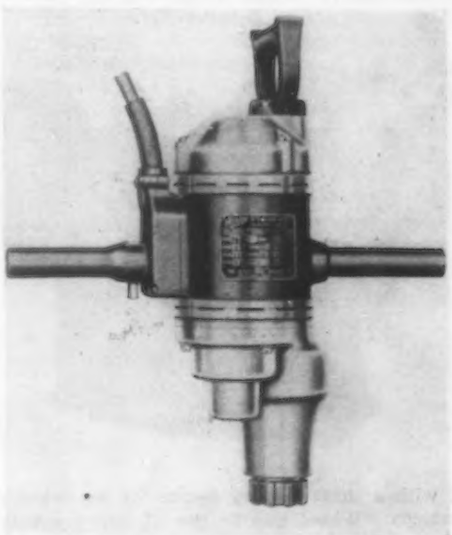
The reciprocating mechanism, which actually strikes the blow, is made up of a special drop forging upon which are mounted two beveled gears weighted on one-half of their area. These weighted gears are driven by a bevel pinion on the spline shaft; consequently they rotate in opposite directions, the two weights being together each half of complete revolution. When the two weights are together at the bottom, the whole reciprocating mechanism mounted on the spline shaft moves downward, striking a heavy blow on the piston, which transmits the blow to the drill or cutting tool being used. When the two weights come around together at the top, the reciprocating mechanism travels up with equal force, but in this case the blow is absorbed by the coil spring.

A centrifugal coupling mounted on the end of the armature shaft acts as a shock absorber between the hammer mechanism and the motor. The spline shaft carrying the reciprocating weight is driven by the motor through this centrifugal coupling instead of direct.

The piston in the nose of the hammer receives the blow from the ram on the reciprocating mechanism and is of "suck-fit" to prevent passage of oil. The piston is supported by a heavy coil spring which absorbs the hammer blow when it is running idle. The hammer strikes 2300 blows per min. The working mechanism, operating in a bath of oil, is sealed against dust.

New 7/8-Inch Universal Drill

The Hisey-Wolf Machine Co., Cincinnati, has recently brought out a ⅞-in. capacity universal drill, the general arrangement of which may be noted from the illustration. The machine is equipped with the company's standard motor which is mounted in ball bearings, these bearings being said to be fitted in such a way that slip and creeping action are eliminated. The gear on armature shaft is removable. The compound gear shaft is supported with a bearing at each end. All gears are of steel, electrically heat-treated.



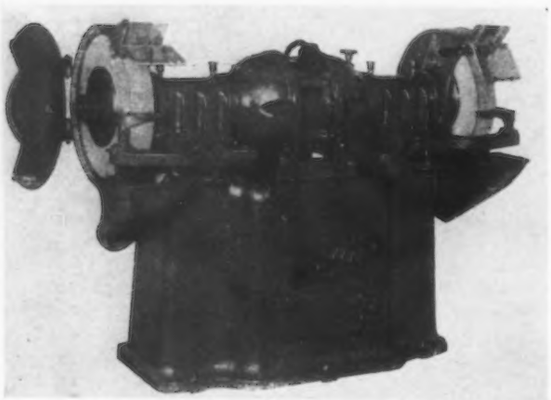
The Motor Is Mounted in Ball Bearings Which Are Arranged to Eliminate Slip and Creeping Action

The drill spindle is fitted with a No. 2 Morse taper socket. It is of liberal dimensions, hardened and ground and is lubricated automatically through the gear case. Brush holders with adjustable spring tension are mounted as a separate unit on a bakelite yoke, which feature permits brush adjustment when necessary. The end handle cover is a rugged casting carrying all pressure applied, and, being independent of the motor and motor bearings, relieves them of all strain. This construction also affords convenient access to the carbon brushes for adjustment or renewal. The company's patented switch is standard equipment.

New Heavy-Duty Motor-Driven Grinding Machines

Two new machines, one a heavy-duty motor-driven grinder, and the other a heavy-duty combination grinding and polishing machine, have been added recently to the line of the Standard Electrical Tool Co., Cincinnati.

The heavy-duty motor-driven grinder is available in three sizes, of 5, 7½ and 10 hp. capacity. These machines are equipped with a General Electric motor and push-button control. Four S.K.F. ball bearings are used, these bearings being encased in dust-proof chambers. The armature shafts are of nickel steel and are



The Combination Grinding and Polishing Machine Is Shown Above and the Double-End Grinder Below

fitted with a shaft locking device for use when changing wheels. Wheel guards are of heavy construction and are of the hinge-door type with exhaust connections. Each guard is fitted with a spark breaker as well as a polished wired glass eye-shield. The 5-hp. machine carries two wheels, 18 in. in diameter, 3-in. face, 2-in. bore. The wheels of the 7½-hp. grinder are 24 in. in diameter, 4-in. face and 2¼-in. bore, and those of the 10-hp. machine are 24 in. by 2¾ in. by 2¼ in. wheels. The smallest machine weighs 1920 lb. and the largest 2375 lb.

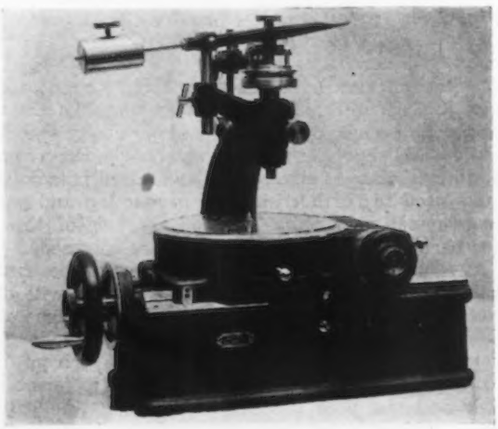
The combination grinding and polishing machine, shown in the second illustration herewith, is available in two sizes, 3- and 5-hp. capacity, respectively. A 40 deg. General Electric motor is also used on this machine as well as the company's push-button control. The armature shafts are of nickel steel and bearings are encased in dust-proof chambers. This machine is also fitted with a shaft locking device for use when changing wheels. In addition to grinding and buffing wheels, a wire wheel or a scratch brush wheel may be used on the machine.

Combined Measuring and Sensitive Drilling Machine

The Societe Genevoise d'Instruments de Physique of Geneva, Switzerland, through its American agent, the R. Y. Ferner Co., Investment Building, Washington, has placed on the market the machine here illustrated, which combines accurate measurements with facilities for the drilling of holes accurately located in master plates or parts of small machines and instruments.

It is primarily a machine for measurements in polar coordinates in that the slide, which moves on the bed of the machine, has a circular table as an integral part of it, with which angular measurements may be made to 30 sec. of an arc. By means of a lead screw, which moves the table along its ways, measurements of length over a range of 4 in. may be made to 0.0002 in. A microscope magnifying 27 times is used for making the readings. This is mounted in the main arm of the machine. When the machine is used for drilling a small headstock is mounted in the arm in place of the microscope.

Supplementing its facilities for making various types of measurements, a headstock is provided by which holes may be drilled to a corresponding accuracy. This headstock is adjustable in height. A sensitive lever, balanced by a counterweight, is used for depressing the drill or end mill through its ½ in. feed. The table can be clamped to the bed of the ma-



In Addition to Measuring Facilities, Holes May Be Drilled With Close Accuracy

chine by means of a lever during drilling. The spindle will take collet chucks up to ¼-in. body and has a drilling capacity up to 0.175 in.

The machine may be used in the tool-room or the inspection department for checking or making special gages, pin gages, thread gages, etc., or for making master plates for small parts or the laying out of cams and profiles. It may be used to advantage also in the model shop or development department of companies using small parts as in watches, meters, computing machines, etc. It is also said to have been found useful in industrial testing or research laboratories, or instrument shops, where a general utility measuring machine is wanted, on which an occasional job of accurate drilling may be done when required. The overall dimensions of the machine are 15 x 19¼ x 14¼ in. high, not including the microscope. Its net weight is 140 lb.

Production of electric power by public utility plants in May is reported by the United States Geological Survey at 6516 millions of kwhr. This compares with 6371 in April and with 6717 in March. More than 40 per cent of the May output was by water power, against 39 per cent in April and 39 per cent in March.

Building construction undertaken during the first six months of 1927 had the greatest volume for the first half of any year on record, according to the Associated General Contractors of America. June showed an increase of 8 per cent over May, while the six months was 4 per cent above the previous record of last year.

European Export Prices Continue Low

Foundry Iron Reduced—German Mills Extending Deliveries—Austria Increases Ore Output—More Cartels Urged

(*By Cable*)

LONDON, ENGLAND, July 4.

PIG iron continues quiet with Cleveland makers anxious for orders, but unable to reduce prices because of costs. Consumers are buying only against urgent needs. No more blast furnaces have been banked, but output is expected to be curtailed further unless demand improves.

Hematite sales are confined to small lots and prices are weakening. Foreign ore continues dull.

Finished iron and steel are quiet, plate rollers still needing orders, but sectional mills are well booked with tonnage.

The Clyde output in June was 25 vessels totaling 40,600 tons.

Tin plate is still dull and more makers are preparing to suspend operation because of the lack of orders. Buyers are offering 18s. 9d. ($4.54) per base box, f.o.b. works port, but few works being willing to sell below 19s. ($4.60) per base box.

Galvanized sheets are quiet except for small orders and makers are more willing to grant concessions. Black sheets are inactive also.

Continental markets are improving and as a result of increased British demand for semi-finished material sellers are showing more restraint. The pig iron entente has reduced foundry iron to £3 ($14.55) per ton, f.o.b. for the United Kingdom and £3 5s. ($15.76) per ton, f.o.b. for Holland. The European Rail Makers' Association has increased the price of heavy rails to £6 7s. 6d. ($30.92) per ton, f.o.b. Light rails have sold at £4 15s. ($23.03) f.o.b.

French production in May was 794,000 metric tons of pig iron and 712,000 tons of steel ingots. At the end of May there were 146 French furnaces in blast.

Mills Quote Extended Deliveries

(*By Radio*)

BERLIN, GERMANY, July 4.

THE pig iron and steel syndicates prices continue unchanged for July. Improvement of business is being maintained and all blast furnaces, steel works and rolling mills are fully occupied and lengthening their delivery terms. A majority of works are refusing to book further orders for semi-finished steel at present.

The heaviest current demand is for structural shapes and thick gage sheets for shipyards. The market for bars and bands is less active and demand for wire rods is declining. Business in heavy rails shows an increase.

Export prices have again weakened and exports of most rolling mill products have declined. Export orders for machinery, with the exception of certain special machines, are limited. The domestic market for machine tools, textile machinery and locomotives, however, is showing more activity.

Germans Urge More Cartels to Stabilize Prices

BERLIN, GERMANY, June 20.—The steel industry is increasingly dissatisfied with the results obtained by the International Steel Cartel. It is pointed out by those opposed to the cartel that it has thus far been ineffective in preventing depressed markets and that there have been only brief indications of a recovery of world market prices since its formation. Since the first of this month, prices of rolled products outside of Germany have declined about 5m. ($1.19) per metric ton. Belgian bars, which were up to £4 18s. 6d. (1.08c. per lb.) per metric ton, f.o.b. Antwerp, in May, are now back to about £4 14s. (1.03c. per lb.) per ton, Antwerp. German steel export, it is claimed, is totally unprofitable, the cartel, which was expected to maintain prices by its system of penalties for overproduction, apparently being unable to prevent members from selling at any price they can obtain.

It is argued by the dissatisfied members in Germany that the only apparent solution is the prompt formation of international sales syndicates for separate products, which shall be authorized to control prices. It is pointed out that such subsidiary syndicates exist in Germany for all products but thin sheets, but in France and Belgium there are no such organizations of the steel in-

British and Continental European prices per gross ton, except where otherwise stated, f. o. b. makers' works, with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd.	£1	1s.				$5.09		
Bilbao Rubio ore†	1	1¾	to £1	2s.		5.27	to	$5.33
Cleveland No. 1 fdy.	3	12½				17,57*		
Cleveland No. 3 fdy.	3	10				16.97*		
Cleveland No. 4 fdy.	3	9				16.73*		
Cleveland No. 4 forge	3	8½				16.61*		
Cleveland basic	3	15	to	3	15½	18.18	to	18.30
East Coast mixed	3	17				18.66		
East Coast hematite	3	17½				18.79		
Rails, 60 lb. and up.	7	15	to	8	5	37.58	to	40.01
Billets	7	5	to	7	10	35.16	to	36.37
Ferromanganese	12	0				58.20		
Ferromanganese (export)	11	15				56.98		
Sheet and tin plate bars, Welsh	6	5				30.31		
Tin plate, base box	0	18¾	to	0	19	4.54	to	4.60
Black sheets, Japanese specifications	14	0	to	14	5	67.90	to	69.11
						C. per Lb.		
Ship plates	7	12½	to	8	0	1.65	to	1.73
Boiler plates	10	10	to	11	0	2.27	to	2.38
Tees	8	2½	to	8	12½	1.75	to	1.87
Channels	7	7½	to	7	17½	1.60	to	1.70
Beams	7	2½	to	7	12½	1.54	to	1.65
Round bars, ¾ to 3 in.	8	0	to	8	10	1.73	to	1.84
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	10	15				2.32		
Galv. sheets, 24 gage	14	2½	to	14	10	3.06	to	3.14
Cold rolled steel strip, 20 gage, nom.	14	0				3.03		

*Export price, 6d. (12c.) per ton higher.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	0s.	to	£3	5s.	$14.55	to	$15.76
France	3	0	to	3	5	14.55	to	15.76
Luxemburg	3	0	to	3	5	14.55	to	15.76
Basic pig iron:								
Belgium	2	19	to	3	0	14.30	to	14.55
France	2	19	to	3	0	14.30	to	14.55
Luxemburg	2	19	to	3	0	14.30	to	14.55
Coke	0	18				4.37		
Billets:								
Belgium	4	6	to	4	8	20.85	to	21.33
France	4	6	to	4	8	20.85	to	21.33
Merchant bars:						C. per Lb.		
Belgium	4	12½				1.01		
France	4	12½				1.01		
Luxemburg	4	12½				1.01		
Joists (beams):								
Belgium	4	14				1.03		
France	4	14				1.03		
Luxemburg	4	14				1.03		
Angles:								
Belgium	4	15				104		
⅛-in. plates:								
Belgium (nominal)	6	5				1.37		
Germany (nominal)	6	5				1.37		
¼-in. ship plates:								
Belgium	6	0				1.32		
Luxemburg	6	0				1.32		
Sheets, heavy:								
Belgium	6	1				1.33		
Germany	6	1				1.33		

(a) Nominal.

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The United Steel Works is making considerable extensions to the August Thyssen works at Hamborn, the total cost when completed being estimated at close to 30,000,000m. ($7,110,000). The extensions include an eighth blast furnace of larger capacity.

Tariff Change Postponed

The Government has decided to continue effective until 1929 the "Minor Customs Tariff" of August, 1925. This tariff would have expired on July 31, as it was a temporary schedule amending only part of the general tariff of 1902, the remainder of which was still in force. When the temporary tariff was passed in 1925 it was expected that a complete revision would be made in 1927, but it has been decided that such a general revision will require two or three years more of preparation. There has been no proposal for revision of the iron and steel schedule of the present tariff. Although the cabinet has passed a resolution accepting all the recommendations of the Geneva Economic Conference on lower tariffs and announces its intention of reducing many duties in the revised general tariff, the only current revisions, which are on food, seem to be upward.

AUSTRIAN BUSINESS BETTER

Unemployment Less—Ore Costs Reduced by Increased Output—Union with Germany Urged

VIENNA, AUSTRIA, June 11.—The industrial situation is beginning to improve. The total number of unemployed has declined to 190,000, of which about 19 per cent are steel and metal workers. Although industrial conditions are better, at a recent meeting of steel producers, the general director of the Alpine Montangesellschaft said that complete restoration of Austrian industry is impossible unless the country joins Germany.

Foreign trade in iron and steel shows little change. Imports in 1926 totaled 128,703 metric tons compared with 138,649 tons in 1925, and exports totaled 286,261 tons compared with 271,624 tons in 1925. Both imports and exports of pig iron showed a decline and exportation of bars was smaller in 1926. The total of exports was apparently maintained only as a result of large increases in the exportation of scrap iron and steel.

The Alpine Montangesellschaft, the only large and important steel company in Austria, produced a total of 330,665 metric tons of pig iron in 1926, a decline from the 379,923 tons produced in 1925. Steel ingot output of the company showed a slight increase in 1926 with 323,618 metric tons, compared with 304,372 metric tons in 1925. Output of rolled material was practically the same with 195,857 last year and 194,703 tons in 1925.

There was no appreciable advantage from the increase last year of the iron and steel tariff. The new duties became effective in August and were largely balanced by substantial freight rate increases. There is a further complaint that the duties on bars in neighboring countries are from 50 to 100 per cent more than the Austrian tariff provides. This situation has been partly improved as a result of the agreements entered into with these countries for regulation of export to one another.

In an effort to reduce the cost of producing iron ore by increasing the output, the Alpine Montangesellschaft is exporting quantities of ore to Czechoslovakia and Poland and will shortly begin shipments to the Ruhr. Reduction of costs has met with success and the company has been able to reduce the number of its employees from about 18,500 to about 12,500.

Electrification of the Austrian alpine railroads is progressing rapidly. Most of the work is being done by four large electric companies, including Brown-Boveri & Co., and the Austrian Siemens-Schuckert Corporation.

FOREIGN BEAMS AGAIN USED

Brooklyn Insists Only on American Sizes—Nippon Tin Plate Postponed

NEW YORK, July 5.—Objections of the Brooklyn authorities to the use of foreign beams in buildings erected in that borough have apparently been withdrawn and importers report an improvement in the volume of orders from fabricators and erectors of this district. However, the current demand for steel is almost exclusively for material made strictly to American specifications. Reinforcing bars are quoted by importers at 1.75c. to 1.80c. per lb., c.i.f., with open-hearth quality from 1.80c. to 1.85c. per lb. Where material is available in small lots directly from the dock, being offered just before, or upon arrival of the ship, the price is several dollars a ton higher, from 2.00c. to 2.20c. per lb. often being paid on bars or structural material.

Export business continues quiet, even the Japanese, who have been fairly active purchasers of various products, showing but little interest in buying at present, possibly in expectation of lower prices. The inquiry of the Nippon Oil Co. for about 29,500 base boxes of oil can size tin plate is understood to have been temporarily withdrawn. The small lot of high T-rails for Kobe municipality has not yet been awarded. The 50 miles of 100-lb. rails for the Hanwa Electric Railway in Japan are expected by Japanese exporters to go to a European mill.

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WASTE IN INDUSTRY

Who Is at Fault, the Employee or Management, When Orders Cannot Be Carried Out?

BY F. C. BIGGERT, JR.*

WHILE traveling recently on a railroad train, I overheard a conversation between two maintenance-of-way men. The conversation started by one of the men, evidently a gang foreman, remarking that he had received a letter calling him down for using new railroad ties on which to pile rails. It appeared that orders had been issued to use discarded ties for this purpose, and that as no old ties were available, he had disregarded the order. The conversation was interesting.

The foreman wanted to know of his buddy what the "humpty hump" he was to do. There was a carload of rails and there was his gang waiting to unload them, and there was a pile of new ties and not a "blinkety blank" old tie that he could discover. Should he go to the nearest telegraph office and wire for four old ties to be sent by special train and let his gang loaf until they came, or should he use a little horse sense by wasting $5 worth of new ties to save $50 worth of time?

Evidently he had used the horse sense method and had been rewarded for his thrift by a "call down" from his superior. Naturally he was out of sorts and inclined to the opinion that railroad men were not expected to use their brains anyway, and only made trouble for themselves when they did use them.

Now looking at the matter in the light of the man's statements, it would seem that his conclusion was justified, but it is to be remembered that we heard only one side of the matter. The superior who had issued the reprimand was not present to defend himself. If the order was really as the foreman stated it, and if his responsibility began and ended with the unloading of the rails, then he was warranted in his action and had been unjustly censured.

But suppose that he was the section foreman and that among the many orders he had received, was one instructing him to save and have available a sufficient number of discarded ties for use in piling rails.

Or suppose that his gang had loaded the rails on the work train and that he had failed to see that old ties were also loaded. In either of these cases, the situation would be mightily changed and the censured foreman could no longer assume the martyr's roll.

But wherever the fault, the result was a waste of value. It is perfectly obvious that discarded ties are quite good enough for piling rails, and that the use of new ties for this purpose is wasteful. It is equally obvious that, unless the order to use old ties be accompanied by instructions for conveniently obtaining them when needed, there may be even greater waste.

So we cannot place the responsibility, but we do know that there actually was a waste of good value, and we may easily see that this situation is typical of the every day happenings in every industry.

Faulty orders are continually being issued and good orders are being disregarded. Orders are not issued which should have been issued, and workmen are waiting for orders when they should be going ahead on their own initiative. This lack of coordination is a prolific source of waste, and greatly reduces the output of the gigantic industries by which we now so largely live and move and have our being. The responsibility lies largely on management. Mr. Herbert Hoover appointed a committee of the federated engineering societies to study waste in industry, and their finding was that more than 50 per cent was due to management, about 20 per cent to labor and the remainder to miscellaneous causes outside the industries themselves. This is a severe arraignment of our industrial management and should stir us to careful consideration of the quality of our stewardship.

We see men in our shops shirking their work or carelessly using valuable material, and are inclined to weep great tears of anguish because of the inefficiency of our men, while a thoughtlessly issued order, or the lack of preparation for a job in hand, may waste ten times as much as the workman's indiscretion. The higher the position in management we occupy, the more wasteful is our personal inefficiency. The foreman at one end of the management and the president at the other, and all those between are in position to have their wastefulness multiplied by the number of men under them.

We are supposed to occupy our positions because of abilities which fit us for the discharge of our duties, but none of us has these abilities as highly developed as might be desired. This may or may not be our fault. The fact of the matter is that we occupy our positions because we are the best material available, and taking industry as a whole, this is not saying very much for us if we use Mr. Hoover's report as the basis of our judgment. The importance of the matter becomes apparent when we study the financial failures of industry. These are almost without exception due to bad management.

But the quality of management in industry generally is improving. The methods successfully used a few years ago would be ruinous today. The report of Mr. Hoover's committee is now six years old, and a similar report as of the present would show the general body of industrial management in a better light.

As units in the great body of industrial management, we each and jointly have a multiple responsibility. We are responsible to our stockholders who have entrusted us with their money; to the public which, in our present civilization, is utterly dependent upon industry; to the people working under us, over whom we occupy in certain measure both the positions of commandant and guardian, and to our families and ourselves as self-respecting people. In this position of responsibility, it is our duty to keep not only abreast but ahead of the advance of management, to maintain the lead which those dependent upon us have learned to expect.

*President United Engineering & Foundry Co., Pittsburgh.

Automotive Exports Well Maintained

WASHINGTON, July 5.—Automotive exports during May totaled $42,322,127, or less than 10 per cent below the record exports of April, according to the Automotive Division, Department of Commerce. Shipments of passenger cars, while 12 per cent below April, were 38.6 per cent above May, 1926. Trucks also were 11.4 per cent below April, but 83 per cent above May of 1926.

In the first five months 138,955 passenger cars were exported, with a value of $101,090,627, compared with 111,076 units, valued at $81,405,348, during the like period of 1926. Truck exports have numbered 47,911, having a value of $29,928,763, against 31,091 units, valued at $20,964,466, in 1926. The average export value of passenger cars and trucks increased during May to $743 and $645, respectively, as compared with $730 and $636 in April.

The St. Louis Coke & Iron Corporation, Granite City, Ill., will soon begin construction of a new power plant. Boilers, fired by pulverized coal, will generate steam for a 10,000-kw. turbogenerator.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***July 14****—Activity in Steel Consuming Industries;* ***July 21****—Position of Iron and Steel Producers;* ***July 28****—General Business Outlook.*

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The United Steel Works is making considerable extensions to the August Thyssen works at Hamborn, the total cost when completed being estimated at close to 30,000,000m. ($7,110,000). The extensions include an eighth blast furnace of larger capacity.

Tariff Change Postponed

The Government has decided to continue effective until 1929 the "Minor Customs Tariff" of August, 1925. This tariff would have expired on July 31, as it was a temporary schedule amending only part of the general tariff of 1902, the remainder of which was still in force. When the temporary tariff was passed in 1925 it was expected that a complete revision would be made in 1927, but it has been decided that such a general revision will require two or three years more of preparation. There has been no proposal for revision of the iron and steel schedule of the present tariff. Although the cabinet has passed a resolution accepting all the recommendations of the Geneva Economic Conference on lower tariffs and announces its intention of reducing many duties in the revised general tariff, the only current revisions, which are on food, seem to be upward.

AUSTRIAN BUSINESS BETTER

Unemployment Less—Ore Costs Reduced by Increased Output—Union with Germany Urged

VIENNA, AUSTRIA, June 11.—The industrial situation is beginning to improve. The total number of unemployed has declined to 190,000, of which about 19 per cent are steel and metal workers. Although industrial conditions are better, at a recent meeting of steel producers, the general director of the Alpine Montangesellschaft said that complete restoration of Austrian industry is impossible unless the country joins Germany.

Foreign trade in iron and steel shows little change. Imports in 1926 totaled 128,703 metric tons compared with 138,649 tons in 1925, and exports totaled 286,261 tons compared with 271,624 tons in 1925. Both imports and exports of pig iron showed a decline and exportation of bars was smaller in 1926. The total of exports was apparently maintained only as a result of large increases in the exportation of scrap iron and steel.

The Alpine Montangesellschaft, the only large and important steel company in Austria, produced a total of 330,665 metric tons of pig iron in 1926, a decline from the 379,923 tons produced in 1925. Steel ingot output of the company showed a slight increase in 1926 with 323,618 metric tons, compared with 304,372 metric tons in 1925. Output of rolled material was practically the same with 195,857 last year and 194,703 tons in 1925.

There was no appreciable advantage from the increase last year of the iron and steel tariff. The new duties became effective in August and were largely balanced by substantial freight rate increases. There is a further complaint that the duties on bars in neighboring countries are from 50 to 100 per cent more than the Austrian tariff provides. This situation has been partly improved as a result of the agreements entered into with these countries for regulation of export to one another.

In an effort to reduce the cost of producing iron ore by increasing the output, the Alpine Montangesellschaft is exporting quantities of ore to Czechoslovakia and Poland and will shortly begin shipments to the Ruhr. Reduction of costs has met with success and the company has been able to reduce the number of its employees from about 18,500 to about 12,500.

Electrification of the Austrian alpine railroads is progressing rapidly. Most of the work is being done by four large electric companies, including Brown-Boveri & Co., and the Austrian Siemens-Schuckert Corporation.

FOREIGN BEAMS AGAIN USED

Brooklyn Insists Only on American Sizes—Nippon Tin Plate Postponed

NEW YORK, July 5.—Objections of the Brooklyn authorities to the use of foreign beams in buildings erected in that borough have apparently been withdrawn and importers report an improvement in the volume of orders from fabricators and erectors of this district. However, the current demand for steel is almost exclusively for material made strictly to American specifications. Reinforcing bars are quoted by importers at 1.75c. to 1.80c. per lb., c.i.f., with open-hearth quality from 1.80c. to 1.85c. per lb. Where material is available in small lots directly from the dock, being offered just before, or upon arrival of the ship, the price is several dollars a ton higher, from 2.00c. to 2.20c. per lb. often being paid on bars or structural material.

Export business continues quiet, even the Japanese, who have been fairly active purchasers of various products, showing but little interest in buying at present, possibly in expectation of lower prices. The inquiry of the Nippon Oil Co. for about 29,500 base boxes of oil can size tin plate is understood to have been temporarily withdrawn. The small lot of high T-rails for Kobe municipality has not yet been awarded. The 50 miles of 100-lb. rails for the Hanwa Electric Railway in Japan are expected by Japanese exporters to go to a European mill.

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WASTE IN INDUSTRY

Who Is at Fault, the Employee or Management, When Orders Cannot Be Carried Out?

BY F. C. BIGGERT, JR.*

WHILE traveling recently on a railroad train, I overheard a conversation between two maintenance-of-way men. The conversation started by one of the men, evidently a gang foreman, remarking that he had received a letter calling him down for using new railroad ties on which to pile rails. It appeared that orders had been issued to use discarded ties for this purpose, and that as no old ties were available, he had disregarded the order. The conversation was interesting.

The foreman wanted to know of his buddy what the "humpty hump" he was to do. There was a carload of rails and there was his gang waiting to unload them, and there was a pile of new ties and not a "blinkety blank" old tie that he could discover. Should he go to the nearest telegraph office and wire for four old ties to be sent by special train and let his gang loaf until they came, or should he use a little horse sense by wasting $5 worth of new ties to save $50 worth of time?

Evidently he had used the horse sense method and had been rewarded for his thrift by a "call down" from his superior. Naturally he was out of sorts and inclined to the opinion that railroad men were not expected to use their brains anyway, and only made trouble for themselves when they did use them.

Now looking at the matter in the light of the man's statements, it would seem that his conclusion was justified, but it is to be remembered that we heard only one side of the matter. The superior who had issued the reprimand was not present to defend himself. If the order was really as the foreman stated it, and if his responsibility began and ended with the unloading of the rails, then he was warranted in his action and had been unjustly censured.

But suppose that he was the section foreman and that among the many orders he had received, was one instructing him to save and have available a sufficient number of discarded ties for use in piling rails.

Or suppose that his gang had loaded the rails on the work train and that he had failed to see that old ties were also loaded. In either of these cases, the situation would be mightily changed and the censured foreman could no longer assume the martyr's roll.

But wherever the fault, the result was a waste of value. It is perfectly obvious that discarded ties are quite good enough for piling rails, and that the use of new ties for this purpose is wasteful. It is equally obvious that, unless the order to use old ties be accompanied by instructions for conveniently obtaining them when needed, there may be even greater waste.

So we cannot place the responsibility, but we do know that there actually was a waste of good value, and we may easily see that this situation is typical of the every day happenings in every industry.

Faulty orders are continually being issued and good orders are being disregarded. Orders are not issued which should have been issued, and workmen are waiting for orders when they should be going ahead on their own initiative. This lack of coordination is a prolific source of waste, and greatly reduces the output of the gigantic industries by which we now so largely live and move and have our being. The responsibility lies largely on management. Mr. Herbert Hoover appointed a committee of the federated engineering societies to study waste in industry, and their finding was that more than 50 per cent was due to management, about 20 per cent to labor and the remainder to miscellaneous causes outside the industries themselves. This is a severe arraignment of our industrial management and should stir us to careful consideration of the quality of our stewardship.

We see men in our shops shirking their work or carelessly using valuable material, and are inclined to weep great tears of anguish because of the inefficiency of our men, while a thoughtlessly issued order, or the lack of preparation for a job in hand, may waste ten times as much as the workman's indiscretion. The higher the position in management we occupy, the more wasteful is our personal inefficiency. The foreman at one end of the management and the president at the other, and all those between are in position to have their wastefulness multiplied by the number of men under them.

We are supposed to occupy our positions because of abilities which fit us for the discharge of our duties, but none of us has these abilities as highly developed as might be desired. This may or may not be our fault. The fact of the matter is that we occupy our positions because we are the best material available, and taking industry as a whole, this is not saying very much for us if we use Mr. Hoover's report as the basis of our judgment. The importance of the matter becomes apparent when we study the financial failures of industry. These are almost without exception due to bad management.

But the quality of management in industry generally is improving. The methods successfully used a few years ago would be ruinous today. The report of Mr. Hoover's committee is now six years old, and a similar report as of the present would show the general body of industrial management in a better light.

As units in the great body of industrial management, we each and jointly have a multiple responsibility. We are responsible to our stockholders who have entrusted us with their money; to the public which, in our present civilization, is utterly dependent upon industry; to the people working under us, over whom we occupy in certain measure both the positions of commandant and guardian, and to our families and ourselves as self-respecting people. In this position of responsibility, it is our duty to keep not only abreast but ahead of the advance of management, to maintain the lead which those dependent upon us have learned to expect.

*President United Engineering & Foundry Co., Pittsburgh.

Automotive Exports Well Maintained

WASHINGTON, July 5.—Automotive exports during May totaled $42,322,127, or less than 10 per cent below the record exports of April, according to the Automotive Division, Department of Commerce. Shipments of passenger cars, while 12 per cent below April, were 38.6 per cent above May, 1926. Trucks also were 11.4 per cent below April, but 83 per cent above May of 1926.

In the first five months 138,955 passenger cars were exported, with a value of $101,090,627, compared with 111,076 units, valued at $81,405,348, during the like period of 1926. Truck exports have numbered 47,911, having a value of $29,928,763, against 31,091 units, valued at $20,964,466, in 1926. The average export value of passenger cars and trucks increased during May to $743 and $645, respectively, as compared with $730 and $636 in April.

The St. Louis Coke & Iron Corporation, Granite City, Ill., will soon begin construction of a new power plant. Boilers, fired by pulverized coal, will generate steam for a 10,000-kw. turbogenerator.

Schedule of the next installments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* ***July 14****—Activity in Steel Consuming Industries;* ***July 21****—Position of Iron and Steel Producers;* ***July 28****—General Business Outlook.*

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The Effects of Freight Rates Upon Industry

THE general inquiry into iron and steel freight rates in Official Classification territory has been followed carefully by THE IRON AGE. Testimony offered two weeks ago by New England steel producers illustrated very concretely the part freight rates may play in building up or undermining the prosperity of an industry in a particular locality. It was even suggested that New England may be forced to limit production of iron and steel to local needs unless favorable freight rates are maintained.

Recognizing the far reaching effects upon the industry which the Interstate Commerce Commission's findings in this case may have, we have reviewed briefly and concisely the position of producing districts, individual companies and the railroads, as brought out in the testimony at the various hearings.

This Issue in Brief

Problem of "dead wood" in stock room is solved by action of joint committee. Accumulation of obsolete parts and space-consuming surplus stocks is prevented by group composed of representatives of purchasing, sales, planning, and engineering departments, which meets semi-monthly.—Page 17.

Flooding of coal-handling belts is prevented by interlocking control. Gas company has several thousand feet of belts. As some belts discharge onto others, overloading and spilling would result if starting and stopping were not closely synchronized. This is accomplished by interlocking control operated from a central tower.—Page 15.

Segregation may be eliminated by using centrifugal casting method instead of ingot casting and blooming. Solidification proceeds at such a rapid rate (30 to 45 sec.) in the centrifugal method that there is little time for segregation to take place.—Page 7.

Steel beams for dwelling construction have holes punched at 3-in. intervals for convenience in erecting. The perforations also furnish support for plumbing and heating pipes and facilitate wiring. Entire frame for steel-frame dwelling was erected in four days.—Page 9.

Open-hearth furnace checker requirements should be defined by weight of the fire brick, exposed surface and area of flue openings. Ample thermal capacity may be determined by using one pound of checker brick in each chamber for each pound of steel produced per heat.—Page 11.

Cure "Tuesday roughness" in sheet and tin mill rolls by rolling short bars. This roughness, due to "crazing," can not be cured by the use of the scouring block, as the fractures are deep and surface dressing will not help. But applying pressure to the roll surface affected closes the fractures for a time.—Page 13.

Chemical analysis is a poor index of pig iron quality, says metallurgist. Old cold-blast charcoal irons had higher carbon and lower silicon content than present day coke irons, and yet the former machined just as readily, and were stronger and better. Carbon formations, which are carried through the melting operation into the casting, determine quality, he says. These formations are altered only if furnaces are operated at high temperatures, from 2800 to 3000 deg.—Page 12.

International steel cartel is not satisfactory to German steel makers. The cartel's opponents point out that depressed markets have not been prevented, and that there have been only temporary indications of a recovery of world market prices since the cartel's formation.—Page 23.

Welded trusses withstand overload without damage to the welds. An overload of 50 per cent above safe loads was placed upon trusses, 30 ft. in span, 5 ft. 6 in. deep. No trace of weakness developed in the welds. Though the trusses were not designed for economical welding, both the drafting room cost and construction time were reduced by welding.—Page 18.

Machinery exports decline but are still relatively high. May exports were valued at close to 36 million dollars, 9 per cent under April, but 10 per cent over May, 1926.—Page 59.

Finds that tensile strength of sheet steel is only slightly affected by shape. Tests of seven specimens in the laboratory of the American Sheet and Tin Plate Manufacturers' Association reveal that neither is yield point affected much by shape.—Page 8.

Conveyors do most of the lifting and carrying in the Maytag plant. Their use in practically every department has brought handling costs close to the irreducible minimum.—Page 4.

Malleable casting industry has lightest month since February. May production of foundries reporting to Washington was 57,655 tons, 54.1 per cent of capacity, and about 2½ per cent below April rate.—Page 15.

Steel-producing costs may be cut from $3 to $6 per ton by centrifugal casting process, says inventor. Blooming would be eliminated and cropping would be reduced from 12 per cent to about 2 per cent.—Page 8.

Flask requirements reduced from 100 per molder to 5 or 6 per molder by continuous molding. As flasks are shaken out in the Maytag foundry, they are constantly coming back to the molder, thus conserving space and capital.—Page 4.

Galvanized wire can be woven into fencing without injury to the galvanized coating, says manufacturer. New fence-weaving machine has continuous wire feed and margin twisters and continuous line wire-coilers.—Page 16.

Imports of iron and steel have fallen off sharply. Total for the first five months was 809,000 tons, 36 per cent under the total of 1,080,781 tons for same period of 1926.—Page 58.

Brass industry very likely will tend to become less and less concentrated geographically. Production of brass sheet, pipe and wire in such industrial centers as Cleveland, St. Louis, Detroit and Chicago probably will increase so that producers will be closer to centers of demand.—Page 29.

Pig iron output drops to 102,988 tons per day in June, a loss of 6397 tons as compared with May, or 5.87 per cent. Nineteen furnaces went out and six were blown in, a net loss of 13, of which 12 were steel company stacks. The total pig iron production for the first half was ahead of the first six months of 1925 and only a few hundred thousand tons behind the corresponding period in 1926.—Page 32.

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Summer Dullness Relative

WHEN the steel trade speaks of this summer as marked for dullness it means only a dullness relative to that of last summer. In the past three years July production of steel ran under the year's average as follows: 1924, 38.9 per cent; 1925, 16.5 per cent; 1926, 7.5 per cent. The industry had a really stagnant summer in 1921, with production 40.6 per cent below the year's average, even though 1921 as a whole showed only half as much tonnage as the mean between the preceding and following year. This year we have a slight reversal of the trend, as summers in recent years have been growing less dull.

By the long range view we find that steel production was having consistent though slight gains through last October, when some sort of a backset occurred, and the question since then has been whether or not there has been a recovery from that backset. It is a remarkable record, of no little significance, that for twenty-four consecutive months, November, 1924, to October, 1926, inclusive, steel production exceeded production in the same month a year previous. Of the eight months since then, four have done the same thing and four have failed, the failures being in November, December, January and June. Thus steel has been growing somewhat irregular.

All the gains, however, have been small. The steel trade has been advantaged more by steadiness than by tonnage. Production by half years has been as follows, beginning with 1923. The showing of 1922 is not important, as that was merely a year of recovery from the extreme depression of 1921:

Steel Ingot Production, Gross Tons

	First Half	Second Half
1923.....	23,326,965	20,158,700
1924.....	19,737,034	17,074,123
1925.....	22,383,071	21,757,667
1926.....	24,153,809	22,782,396
1927.....	24,000,000*	.....

*Roundly estimated; probably a trifle high.

Here are quite consistent gains, merely with 1924 as a slightly off year. It seems to be normal for the second half to show less tonnage than the first half. The proportions have been as follows:

	First Half	Second Half		First Half	Second Half
1923.....	53.6	46.4	1925.....	50.7	49.3
1924.....	53.6	46.4	1926.....	51.5	48.5

The average proportion in the four years is not particularly important, but it may be mentioned that it runs 52.35 to 47.65, or slightly under 9 per cent loss for a second half from a first half.

No "normal" annual gain can be figured so conservatively as to be within the limits of the slight gains shown above. In four years first half production has gained not more than 3 per cent. For eight months the steel trade has been in a mild recession and the question is where we stand, at the moment, in this movement.

Dispersion of Brass Manufacture

DISCUSSING a proposal to erect a steel plant in Montana, it was recently pointed out in these columns that iron ore and power alone are insufficient to warrant such an establishment; a nearby market for the product is also required. This is but a phase of the general proposition that commodities available in the raw state nearly everywhere (like lumber, iron, cement, brick) have a "place" value, as well as intrinsic value. True enough, there is enormous consumption of these materials; all industry uses them. But satisfactory sources of raw materials are numerous and widely scattered. This invites dispersion of production. The manufacturer near his market has the one great advantage of low delivery cost which may counterbalance better raw material, more efficient plant, or larger operations of a distant competitor. Hence an automobilist frequently passes tiny saw mills, making boards, studding and joists for the local demand wherever suitable timber can be found.

This "place" value, which is only the reflection of freight rates upon the selling price, is responsible for a similar tendency in the dispersion of manufacturing operations on commodities of higher intrinsic value like copper, nickel, zinc and

tin. Production of these metals is in a different class from iron. They are rare in occurrence and consequently seldom near a consuming region. The grade of ore is low, so they must be concentrated and smelted to be freighted out cheaply. The consumer of ingot metals is himself a fabricator; he transforms them into an alloy and shapes it into useful products like sheets, wire or pipe ready for other workmen, or makes castings and hardware for sale to Mr. and Mrs. Tom, Dick or Harry. Purchasers of these alloys require materials of high finish or bulkiness, which must be carefully packed and boxed to insure against damage, and even then take a high freight rate. This means that prices increase with distance from the manufacturing point. We therefore find brass fabricators scattered here and there about the country in increasing number, often making one or two specialties in a small way, yet near enough to their market to capture and hold the trade securely from a big and powerful organization with a mill several hundred miles distant.

While there is not much danger of brass fabricators moving to the Rocky Mountains, despite the conjunction of copper and zinc in that region, because the market is not there, we do look for an increasing production of brass sheet, pipe and wire at points nearer such industrial centers as Cleveland, Detroit, Chicago and St. Louis than is the Naugatuck Valley.

Passing of the First Iron Warship

EIGHTY-FIVE years of active life mark the career of the first iron warship ever built, now to be sold for scrap by the United States Navy Department. Assembled in sections, the Michigan was launched in 1842 at Erie, Pa., the parts having been fabricated at Pittsburgh. Later, at the ripe age of 64, she was re-named Wolverine, that the name Michigan might attach to the first battleship of the dreadnought type built in the United States—the first such ship ever designed anywhere.

Driven by paddle-wheels, the Michigan antedated by two years the first screw-propelled warship, U. S. S. Princeton. Her engine, of two inclined cylinders, furnished about 365 horsepower. It would take 500 such engines to develop the power going into the new American airplane carrier Saratoga. The Wolverine is 165 feet long; the Saratoga, 850 feet on the water line. And, as the Michigan, the premier iron war vessel cost $47,795, about one-ninth of one per cent on the cost of the Saratoga.

Such longevity is not looked for in modern ships. Science and design move swiftly, and obsolescence is never far behind.

FOR the privilege of supporting walking delegates, members of labor unions pay dues higher in many instances than those paid by business organizations to their associations. In one of the cities in the Middle West iron workers and printers pay $60 a year each, bricklayers pay $50, plumbers $30 and other crafts varying amounts above and below those given. In that same city membership in the local Chamber of Commerce costs $50, a bank capitalized at $500,000 pays $75 to the American Bankers' Association, an advertising man pays his local club $24 and a general contractor pays his national association $55. A dozen ironworkers pay as much for their organization as the largest bank in the United States pays for its membership in the American Bankers' Association. To what extent the labor union member gets his money's worth is not revealed, but the size of the dues may have something to do with the continual demand in some trades for higher and ever higher wages.

Headway in Non-Destructive Testing

FOR many years a goal of investigators has been the determination of physical properties of steel without destroying the metal—the general use of non-destructive testing. Today the approach to that goal is the nearest it has yet been.

Notable contributions to this advance were made at the annual convention two weeks ago of the American Society for Testing Materials. For some years a group of men in this society has been cooperatively studying problems in magnetic analysis with remarkable results. At the recent convention the successful magnetic analysis of the metal in steam turbine bucket wheels was announced, as well as the invention of a new device known as the duroscope, which promises to be capable of determining the hardness of magnetizable objects in general and of aiding in the study of the structure and properties of the material. More noteworthy still was the description of a new method of magnetic analysis developed by A. V. deForest by which certain properties of small forgings and other products are readily determined.

These important announcements are a prophecy of what is to come, as also a demonstration of what coordinated research can accomplish. Other investigations under way in this field assure even more successful results and on a broader scale—particularly in non-destructive testing of rails even when in service. If the cooperative methods used by the committee on magnetic analysis could be applied to fatigue of metals and to X-ray studies, progress in both those fields would undoubtedly be more rapid.

Taxes High, but Outlay More

THE National Industrial Conference Board is becoming our central organization for the collection of fundamental economic data and as such is serving a highly useful purpose. It has the great merit of being practical rather than academic. It concerns itself with broad subjects and its reports are as of the organization, not as of individuals offering a thesis. We have thought that much of the excellent work of this organization in the past has been blunted in its points by being presented in too voluminous a manner. We are pleased to see that recently its publications have been briefer and more incisive.

Late reports of the Conference Board have had to do with the amount of the national wealth, of the national income, and of the national taxation. If to these subjects were added the national saving there would be a good picture of our economic fundamentals.

It is not to be assumed that the work of the Conference Board in each of these fields is equally good. Its treatment of the national wealth was not so satisfactory as could have been wished. This is a subject that has grown more and more

complicated and confused owing to the consequences of inflation, and it is doubtful if any longer it is capable of such analysis as was possible only five years ago. The subject of the national income is much simpler. In this field the Conference Board has recently added itself as an estimator, so that we have now three lines of regular figures—including those of the National Bureau of Economic Research and of Dr. W. R. Ingalls—while the Federal Trade Commission has estimated for certain years. It is beneficial to have such independent estimates for the sake of confirmation.

The estimation of the national income by the National Bureau of Economic Research has a different meaning from that of the other sources named. Confining our attention to those authorities whose estimates refer to the same thing it appears that they agree very well. Averaging their figures for recent years we may conclude that our national income from the production of goods and services was about 70 billion dollars in 1924, 75 billion in 1925 and 78 billion in 1926.

These estimates lend great interest to the computations of the Conference Board in respect to taxation. It is shown that the total collected by the Federal, State and local governments was 7.8 billion dollars in 1924, 7.9 in 1925, and 8.5 in 1926. In each year, therefore, the demand of the tax gatherers was from 10½ to 11 per cent of the current national income.

The Conference Board brings out, however, a more serious condition, which heretofore has not been so well elucidated, and that is that the expenditures by governments exceed greatly their tax collections. Thus in 1925 the total of governmental expenditure was about 11.1 billion dollars, implying that about three billion dollars was derived from the proceeds of bonds. It is not merely an implication, but an inference, that the labor of nearly one-seventh of our working population is diverted to the purposes of government—administering our affairs, policing us, schooling our children, carrying our mail, and building roads and other works for us. We may well pause to consider whether we can stand this.

It is well known that State, county and municipal bonds are for the most part being renewed as they fall due. So long as they can sell the issues the bankers evince no concern in respect to this. There will be buyers so long as principal and interest are regarded as secure and the States, counties and towns have command of taxation for that purpose. The same States, counties and towns are likely to find themselves owing money for the construction of roads that have been worn out. Economically the running wild of public expenditure is one of the most ominous conditions now facing us.

SOMETHING of the high pace of industry during the past few months is indicated by the rates for car loadings on Class 1 railroads. The week ended June 18 provided the tenth week of the year during which more than 1,000,000 cars had been loaded. The tenth million-car week last year was not reached until Aug. 1. In no other year has it been reached before August. As recently as 1924 there were only 11 million-car weeks in the entire year, and most of the big movement comes in the fall. Only five weeks in last year's record-breaking total had shown a million cars prior to June 18. In neither 1924 nor 1925 did the first half-year provide any million-car weeks.

American Use of Machinery

MORE than half of the entire world production of machinery is absorbed by the people of the United States. Figures presented at the recent International Economic Conference show that in 1925 this country produced 57.6 per cent of all the machinery made in all countries, and exported 10.1 per cent of its production. Disregarding imports, which are a mere drop in the bucket, it appears that the domestic market took up almost 52 per cent of the world output. Two factors, both familiar, may be regarded as responsible for this situation. One is the immense buying power of the American people, individually and in the aggregate; the other is the great extent to which machinery is utilized in this country in lieu of manual effort.

Exports form a much smaller proportion of American machinery business than in the other principal producing countries. Even so, our machinery exports in 1925 were more than one-third of world exports of machinery, and were more than 40 per cent higher than the exports of our nearest competitor, Great Britain. For every thousand dollars of machinery produced in the United States for export, $8,920 of machinery is produced for the domestic market. On the same basis of comparison, Great Britain produced only $2,350 of machinery for local consumption for each $1,000 of machinery for export, and Germany $2,950 for her own citizens to each $1,000 for export. The world as a whole exports one-sixth of its production and absorbs in the countries of manufacture the remaining five-sixths.

Problem of Employees' Automobiles

PARKING of the automobiles of employees of industrial plants, particularly those located in cities, has become more and more a perplexity of management. Each year the percentage of workers who own cars is larger, a chief reason being that the automobile permits the establishing of homes at a distance from the place of employment. The tenement dweller of the better type is becoming a suburbanite, having his home and garden located in clean and wholesome surroundings.

In order that the worker's automobile may be used in his journey to and from his employment it must be parked somewhere near the plant for long hours. In many such city neighborhoods municipal parking laws interfere. The lining of curbs with cars all day is resented by property owners and may even interfere with the business of the plant itself. Industrial companies are anxious to do all they can within reason to solve the problem and have given much time and study to it. Land and buildings have been provided, used solely in connection with the parking of cars of employees.

The National Industrial Conference Board in a recent bulletin tells of the results of a survey of this subject. If a plant is located in a city, it

points out, land is valuable and most if not all of it is utilized for purposes of manufacturing. In one case considerable difficulty was encountered in buying land on which to build a garage. When the property owners found that the factory was seeking to buy it they raised their prices, and it was only after many efforts that a convenient location was bought at a reasonable price.

Because of the large investment involved it has been found necessary by some managements to charge employees a small fee for use of the garage. In return the workers are assured a heated, waterproof building and a reserved space for their cars. As a rule these garages are in much greater demand in winter than in summer. To equalize the difference one company charges only $2 a month if space is reserved by the year, and $3 a month if it is used only in the cold weather.

Absence of parking facilities has been found to be a drawback in a number of ways. Men are called from their employment by traffic officers who demand the removal of cars that had been left standing for the day. Occasionally a man must be let off to appear in court for violation of some parking rule. The worrying type of employee is nagged by the threat of theft or of damage to his car. Men have been known to change their places of employment because of the lack of parking facilities.

DE-RUSTING PIPING

Removal of Oxide from Pipe Systems by an Acid Solvent

BY F. N. SPELLER*, E. L. CHAPPELL AND R. P. RUSSELL

INITIAL application of a new method of removing rust from the cold-water piping of a large New York office building, where the water supply capacity of the system had been seriously diminished by rust accumulations, is described in the paper. The method is thought to be equally applicable to removal of rust from condensers, boilers, heaters and other fabricated systems which would be expensive to take down and clean by ordinary methods. The removal has been accomplished by dissolving the rust in acid rendered inert toward the metal by the addition of inhibitors.

A number of methods for retarding corrosion and at the same time removing corrosion products have been advocated. Perhaps the most widely known are a number of proprietary compounds of which the active ingredient is silicate of soda. These compounds seem to have been moderately successful, in hot water at least, in preventing red water. In cold water, however, because of abuses in application, leading to occasional very high concentration in drinking water, the New York Board of Health found it necessary to forbid their use.

For hot-water systems deaerators which remove the dissolved oxygen from water mechanically, and deactivators which remove the oxygen by allowing it to combine with scrap iron, have proved effective when given intelligent attention. When the dissolved oxygen is removed from hot water, corrosion not only ceases but the previously accumulated corrosion products loosen and are removed.

Problem of a Definite Building

Development of this cleaning method resulted from trouble in a 35-story office building in downtown New York, completed in 1912 and occupied by tenants of the highest class. In the last few years several lines in the offices became stopped and new exposed lines had to be run. Replacement would be enormously expensive, since much of the piping is concealed behind marble walls or in plastered columns. Exposed piping is not desirable because of the appearance.

Examination showed the piping to be physically sound. In view of the conditions, the logical thing to do was to remove the rust directly from the piping without disturbing the latter. A practical means of doing this was found in a strong acid solvent which dissolved the rust without injuring the pipe.

The general plan of cleaning was to cut off the section of piping to be cleaned, drain out the water, and fill the piping with the rust solvent, running it in by gravity from a special connection. The building is divided into sections of 6 to 8 floors, each fed from a gravity tank. These sections were chosen as units for the cleaning. The rust solvent was mixed in two barrels, one or two floors above the gravity tank, and alternately fed from these down through a rubber hose. The rust solvent had been so chosen as to completely dissolve the rust in from 5 to 6 hr.

At the end of the 6-hr. period, when all the rust was dissolved, the barrels were filled with clean water and allowed to wash down the hose and connections. The supply tank valve was then opened and the entire system thoroughly washed with water, each faucet and other outlet being given a careful test to make sure that all solvent and rust particles were washed out.

Difficulties Encountered

Several complications arose in the early treatments. It was foreseen that if all details were not properly handled the solvent, instead of cleaning out the piping, would merely loosen the rust and stop up the pipe. However, experience showed that if the details of solvent renewal, etc., were properly watched no stoppages occurred. There was practically no trouble from this source in the later treatments. A definite technic of applying pressure to the outlet end of the line was developed, which rapidly opened any temporary stoppages which occurred.

Many details required close attention. All basins were covered with cardboard to prevent spattering of solvent on carpets and walls. Particular attention had to be paid to protecting marble, since the solvent rapidly dissolves this material. Certain types of toilet bowls were specially flushed to avoid solution of the seating joints. Certain types of fiber washers are attacked by the solvent. These and other details were comparatively easy to handle after their existence was shown by experience. They, however, all combine to make the operation one requiring experienced supervision for its successful working.

Details of Action

The rust solvent was a strong, hot solution of hydrochloric acid (prepared by mixing commercial acid with hot water) to which an inhibitor was added to protect the steel. The acid solvent used has been tested for as much as 64 hr. on steel piping and no appreciable attack was found to have occurred. It has been found that the rate of attack of the solvent is about 10 times as great on wrought iron as on steel, and about 20 times as great on malleable iron as on steel. But even on these two less resistant materials the rate of attack is not great enough to cause injury.

It may be emphasized that the action is one of true solution of the rust, the iron being dissolved as ferrous and ferric chloride. Where only loosening occurs, stoppage is probable. Hence it is necessary to maintain a nice balance between all conditions to insure smooth working. Patents have been applied for upon the operation.

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*Metallurgical engineer, National Tube Co., Pittsburgh. This is abstract of a paper read June 3 at the annual meeting in Cleveland, of the American Institute of Chemical Engineers.

The St. Louis office of the American Rolling Mill Co., Middletown, Ohio, has been removed from the Boatmen's Bank Building to 901 Ambassador Building.

June Iron Output Declines Sharply

Complete Returns Show Daily Rate Was 6397 Tons or About 6 Per Cent Less Than in May—Net Loss of 13 Furnaces

PIG iron production in June fell sharply from that of May, accentuating the decline which appeared in that month. Complete returns from all furnaces show a daily rate of 102,988 gross tons or a decline of 6397 tons per day, from the 109,385 tons as the daily rate in May. This is a falling off of 5.87 per cent and compares with a decrease in May from April of 4.1 per cent. The June operations were the smallest for the year except in January, when the rate was 100,123 tons per day. A year ago the daily rate was 107,844 tons, making June this year 4856 tons per day or 4.5 per cent less.

Production of coke pig iron for the 30 days in June was 3,089,651 tons or 102,988 tons per day as against 3,390,940 tons or 109,385 tons per day for the 31 days in May.

Net Loss of 13 Furnaces in June

In June, 19 furnaces were shut down and six were blown in, the net loss being 13. This compares with a net loss in May of nine furnaces and with a net loss of three in April. In March there was a net gain of six furnaces.

Of the 19 furnaces shut down in June, 11 were Steel Corporation stacks, six belonged to independent steel companies and two were merchant furnaces. The

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchants*	Total
June, 1926	82,186	25,658	107,844
July	79,392	24,586	103,978
August	78,216	25,025	103,241
September	81,224	23,319	104,543
October	83,188	24,365	107,553
November	82,820	25,070	107,890
December	74,909	24,803	99,712
January, 1927	75,609	24,514	100,123
February	80,595	24,429	105,024
March	86,304	26,062	112,366
April	87,930	26,144	114,074
May	84,486	24,899	109,385
June	78,110	24,878	102,988

*Includes pig iron made for the market by steel companies.

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York and Mass.	216,194	227,105	224,933	232,561
Lehigh Valley	84,388	87,198	88,409	97,046
Schuylkill Valley	58,224	74,892	79,693	86,357
Lower Susq. and Lebanon Valleys.	30,300	41,274	47,828	52,922
Pittsburgh district	573,967	680,858	713,181	725,418
Shenango Valley	118,233	123,075	127,760	127,295
Western Penna.	98,676	116,771	131,359	126,905
Maryland, Virginia and Kentucky	96,676	106,601	96,880	99,366
Wheeling district	136,251	150,487	152,155	136,116
Mahoning Valley	272,834	275,904	280,266	301,941
Central and Northern Ohio	340,810	346,620	333,866	353,977
Southern Ohio	41,828	43,995	44,762	47,567
Illinois and Indiana	649,019	705,759	690,308	661,496
Mich., Minn., Mo., Wis., Colo. and Utah	140,507	147,755	149,656	156,405
Alabama	220,230	250,456	251,401	271,097
Tennessee	11,514	12,190	9,769	6,893
Total	3,089,651	3,390,940	3,422,226	3,483,362

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1922—Gross Tons

	1923	1924	1925	1926	1927
Jan.	104,181	97,384	108,720	106,974	100,123
Feb.	106,935	106,026	114,791	104,408	105,024
Mar.	113,673	111,809	114,975	111,032	112,366
Apr.	118,324	107,781	108,632	115,004	114,074
May	124,764	84,358	94,542	112,304	109,385
June	122,548	67,541	89,115	107,844	102,988
½ year	115,147	95,794	105,039	109,660	107,351
July	118,656	57,577	85,936	103,978	.....
Aug.	111,274	60,875	87,241	103,241	.....
Sept.	104,184	68,442	90,873	104,543	.....
Oct.	101,586	79,907	97,528	107,553	.....
Nov.	96,476	83,656	100,767	107,890	.....
Dec.	94,225	95,539	104,853	99,712	.....
Year	109,713	85,075	99,735	107,043	.....

Coke Furnaces in Blast

Furnaces:	Total Stacks	July 1 In Blast	July 1 Capacity per Day	June 1 In Blast	June 1 Capacity per Day
New York:					
Buffalo	21	12	5,490	12	5,615
Other N. Y. and Mass.	6	4	1,715	4	1,690
New Jersey	3	0	....	0	....
Pennsylvania:					
Lehigh Valley	11	6	2,530	6	2,580
Spiegeleisen	2	2	280	2	290
Schuylkill Valley	12	4	1,750	5	2,060
Susquehanna Valley	4	2	810	3	1,275
Ferromanganese	1	1	65	1	60
Lebanon Valley	0	0	....	0	....
Ferromanganese	2	0	....	0	....
Pittsburgh District	52	28	17,200	34	20,365
Ferromanganese	4	3	495	2	385
Shenango Valley	13	8	3,940	8	3,970
Western Pennsylvania	18	6	3,000	6	3,360
Ferromanganese	2	2	420	2	420
Maryland	5	5	2,215	6	2,765
Ferromanganese	1	0	....	0	....
Wheeling District	13	8	4,455	9	4,855
Ohio:					
Mahoning Valley	26	15	9,030	15	8,850
Central and Northern	23	20	11,590	19	11,165
Southern	13	4	1,075	5	1,420
Illinois and Indiana	44	32	20,910	35	22,670
Mich., Wis. and Minn.	12	7	3,120	6	2,880
Colo., Mo. and Utah	7	4	1,860	4	1,875
The South:					
Virginia	14	1	230	1	230
Ferromanganese	1	0	....	0	....
Kentucky	5	2	690	2	660
Alabama	34	18	6,925	20	7,540
Ferromanganese	1	1	60	1	70
Tennessee	12	3	385	3	395
Total	362	198	100,240	211	107,445

Production of Steel Companies for Own Use—Gross Tons

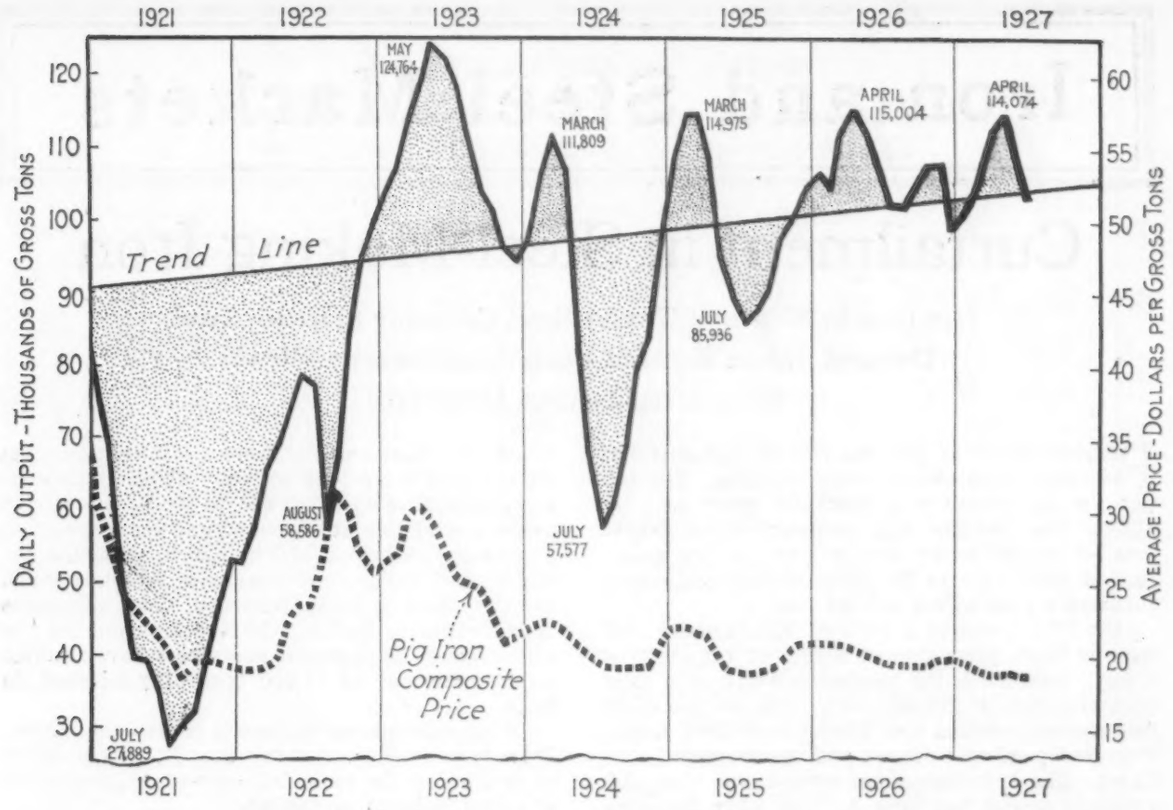
	Total Iron, Spiegel and Ferro		Spiegeleisen and Ferromanganese*			
			1926		1927	
	1926	1927	Fe-Mn	Spiegel	Fe-Mn	Spiegel
Jan.	2,599,876	2,343,881	29,129	7,746	31,844	7,486
Feb.	2,272,150	2,256,651	22,309	7,084	24,560	7,045
Mar.	2,661,092	2,675,417	24,064	7,339	27,834	7,650
Apr.	2,677,094	2,637,919	24,134	7,051	24,735	12,907
May	2,687,138	2,619,078	23,159	6,999	28,734	9,788
June	2,465,583	2,343,409	25,378	5,864	29,232	10,535
½ year	15,362,933	14,876,355	148,173	42,083	166,939	55,411
July	2,461,161	.....	26,877	3,699	....	....
Aug.	2,424,687	.....	23,557	4,372	....	....
Sept.	2,436,733	.....	25,218	2,925	....	....
Oct.	2,578,830	.....	28,473	6,295	....	....
Nov.	2,484,620	.....	31,903	7,565	....	....
Dec.	2,322,180	.....	31,627	7,157	....	....
Year	30,071,144	.....	315,828	74,096	....	....

*Includes output of merchant furnaces.

Production of Coke and Anthracite Pig Iron in United States By Months, Beginning Jan. 1, 1924—Gross Tons

	1925	1926	1927
Jan.	3,370,336	3,316,201	3,103,820
Feb.	3,214,143	2,923,415	2,940,679
Mar.	3,564,247	3,441,986	3,483,362
Apr.	3,258,958	3,450,122	3,422,226
May	2,930,807	3,481,428	3,390,940
June	2,673,457	3,235,309	3,089,651
½ year	19,011,948	19,848,461	19,430,678
July	2,664,024	3,223,338	.....
Aug.	2,704,476	3,200,479	.....
Sept.	2,726,198	3,136,293	.....
Oct.	3,023,370	3,334,132	.....
Nov.	3,023,006	3,236,707	.....
Dec.	3,250,448	3,091,060	.....
Year*	36,403,470	39,070,470	.....

*These totals do not include charcoal pig iron. The 1926 production of this iron was 163,880 tons.



Daily Pig Iron Output in June Was 5.87 Per Cent Lower Than in May; Composite Price Decreases

Inclined Line represents the gradually increasing theoretical needs of the country, and shows that production is now below the so-called normal. Dotted line represents THE IRON AGE *composite price*

six furnaces blown in were divided as follows: Steel Corporation, two; independent steel companies, three; merchant, one.

Capacity Active on July 1

On July 1 there were 198 furnaces in blast as compared with 211 on June 1. The estimated operating rate of the 198 furnaces on July 1 was 100,240 tons per day as against 107,445 tons per day for the 211 furnaces on June 1.

Large Ferromanganese Output

The second largest ferromanganese production for the year was recorded in June—29,232 tons, the largest having been 31,844 tons in January. Spiegeleisen output was again high in June at 10,535 tons, also the second largest this year, the April production having been 12,907 tons.

The number of possible active furnaces is unchanged at 362.

First Half Output Less Than Last Year

For the six months of 1927, the total pig iron output was 19,430,678 tons. This is 417,783 tons or 2.1 per cent less than the production for the first half of last year, which was 19,848,461. It exceeds, however, the first half production of 1925 at 19,011,948 tons.

Furnaces Blown In and Out

Among the furnaces blown in during June were No. 2 Carrie furnace of the Carnegie Steel Co.; the Colonial furnace in western Pennsylvania; No. 2 Hubbard furnace of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one Columbus furnace of the American Rolling Mill Co. in central Ohio; one Madeline furnace of the Inland Steel Co. in the Chicago district and the Zenith furnace in Minnesota.

Among the furnaces blown out or banked during June were the Keystone furnace in the Schuylkill Valley; E furnace at the Steelton plant of the Bethlehem Steel Corporation in the lower Susquehanna Valley; No. 5 Carrie furnace, H and K Edgar Thomson furnaces of the Carnegie Steel Co., one Aliquippa and one Eliza furnace of the Jones & Laughlin Steel Corporation and No. 3 Monongahela furnace of the Pittsburgh Steel Co. in the Pittsburgh district; G furnace at the Cambria plant of the Bethlehem Steel Corporation in western Pennsylvania; A furnace at the Sparrows Point plant of the Bethlehem Steel Corporation in Maryland; No. 3 Mingo furnace of the Carnegie Steel Co. in the Wheeling district; No. 2 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; the Ironton furnace of the Marting Iron & Steel Co. in southern Ohio; No. 3 and No. 9 South Chicago furnaces of the Illinois Steel Co. and No. 1 and No. 7 Gary furnaces in the Chicago district and Nos. 3 and 4 Bessemer furnaces of the Tennessee Coal, Iron & Railroad Co. in Alabama.

India As a Steel Market

Speculation is rife in England as to the outlet which India is likely to provide for British steel in the years ahead. Imports into India of iron and steel products in the three most recent years averaged 939,000 gross tons. England's proportion, however, has been dropping. In several pre-war years England's average of shipments of steel to India amounted to 598,000 tons, against 258,000 tons for all other countries. In 1912-13 England sent 659,000 tons and all other countries 264,000 tons.

Since the war, however, while the total imports have been about as before, the proportions have materially altered. In 1924-25 British exports to India were 494,000 tons and all other countries 429,000 tons. In 1925-26 England's share was 528,000 tons and that of other countries 432,000 tons.

Iron and Steel Markets

Curtailment in Steel-Making Iron

Net Loss in Month of Twelve Steel Company Stacks— Steel Demand Shows Signs of Some Improvement—Fewer Price Irregularities Uncovered

PRODUCTION of pig iron was sharply curtailed in June and chiefly by steel companies. The output for the month was 3,089,651 gross tons, or 102,988 tons per day, and compares with 3,390,940 tons, or 109,385 tons a day, in May. Of the reduction of 6397 tons in the daily average, merchant furnaces accounted for only 21 tons.

On July 1, out of a total of 362 furnaces, 198 were in blast, producing at a rate of 100,240 tons a day. On June 1, the number was 211, at a daily producing rate of 107,445 tons. The net loss of 13 furnaces represented nine Steel Corporation stacks, three independent furnaces and one merchant producer. The last time there were fewer than 200 stacks in service was Sept. 1, 1925, when the number was 192.

While the drop from May to June this year was 5.87 per cent as against 3.97 per cent last year, the half year's output, 19,431,000 tons, comes to about 2 per cent under the 19,848,000 tons of the first six months of 1926.

As the steel trade enters upon the second half of the year, there are indications of some improvement in business and a broader effort of producers to hold at least the present margin between prices and costs.

Although the amount of buying repeats the fairly steady rate of the past few weeks, Chicago reports that the railroads are actively seeking miscellaneous tonnages for maintaining rolling stock and unexpectedly two Western roads bought a total of 1500 cars. One other outstanding item of buying by the carriers is 42,000 tons of rails for the Southern Railway and subsidiaries.

Shipments still exceed orders, but heat and the holiday have cut heavily into operations. As a measure of these adjusting influences is the state of the Steel Corporation's production, which will probably show ten points loss for the week, or 55 per cent of capacity for the time being. A balancing of operations and demand is looked for this month. Expansion seems to await alone on consumers getting a clearer idea than they now have of what will be their needs for the coming months.

Pig iron sales at St. Louis, totaling 28,000 tons, were the largest for several months, but there is generally little buying interest as the third quarter opens. A favorable feature in the Central West is the large flow of specifications from the automobile industry. In many cases foundries have not covered requirements beyond a carry-over from the last quarter. Surplus pig iron of steel companies is becoming more of a market factor. A radiator company has placed 5000 tons of foundry iron with a western Pennsylvania steel works.

An Eastern steel company has bought a large tonnage of heavy melting scrap at $14, delivered, a decline of 50c. as compared with its last sizable purchase. In other sections there are indications that old material is scraping bottom. At St. Louis various grades have advanced 25c. to 50c. a ton. Recent prices are holding at Cleveland and the market has a stronger undertone at Pittsburgh, reflecting the inability of Valley steel companies to obtain usual supplies from Detroit, following Lake shipments from Detroit to Buffalo. In New England the low prices offered by domestic consumers have resulted in the shipment of 11,000 tons of yard steel to Italy.

Wire makers seem successful in restoring prices. There is no evidence that less than $2.55 is accepted on new orders for nails, but current shipments are at prices hitherto prevailing.

Contracting for bolts and nuts for the third quarter is in good volume at the ruling prices, but specifications are not more than usual for the dull summer period. Rivet makers are getting $3 a 100 lb. for the large size on small lots to non-contracting consumers.

The week's railroad car orders, totaling 1820 cars, included 1000 for the Chicago & North Western, 500 for the North American Car Co. and 250 for the Great Northern. Two roads are inquiring for 30 locomotives and the Pennsylvania will build 25 in its own shops.

Structural steel contracts of 33,000 tons include the Koppers Building in Pittsburgh, 8000 tons; a bridge over the Mississippi River at Cairo, Ill., 5800 tons, and a power plant at Detroit, 5250 tons. Fresh projects total 24,000 tons, of which 6000 tons is for a savings bank in Brooklyn.

In the case of the heavy tonnage products, exceptional quotations were few. Competition on a large project in the East brought out 1.65c., Pittsburgh basis, on shapes. In Chicago, a concession of $2 a ton was offered, without takers, on 2000-ton lots of either structural steel or plates for immediate shipment.

Machinery exports in May totaled $35,969,289, a drop from the $39,793,078 in April, which was the highest figure in some years. Exports of industrial machinery in April and May exceeded those of any two months since 1921. For five months, the machinery exports, at $176,687,000, are behind last year's $188,899,000, and imports are above last year, $9,799,000 to $8,551,000.

The European Rail Makers' Association has increased the price of heavy section rails slightly, to about $31 a ton.

German exports of most rolled products have declined and export prices have weakened, but German domestic business in steel is active.

Both of THE IRON AGE composite prices remain unchanged from last week, that for pig iron at $18.71 a ton and that for finished steel at 2.367c. a lb.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	July 5, 1927	June 28, 1927	June 7, 1927	July 6, 1926
No. 2, fdy., Philadelphia	$21.26	$21.26	$21.76	$21.76
No. 2, Valley furnace	18.00	18.00	18.50	17.75
No. 2, Southern, Cin'ti	21.69	21.69	21.69	24.19
No. 2, Birmingham	18.00	18.00	18.00	21.00
No. 2, foundry, Chicago*	20.00	20.00	20.00	21.00
Basic, del'd eastern Pa.	20.75	20.75	20.75	21.00
Basic, Valley furnace	17.50	17.50	18.00	18.00
Valley Bessemer, del. P'gh	20.26	20.26	20.76	20.76
Malleable, Chicago*	20.00	20.00	20.00	21.00
Malleable, Valley	18.00	18.00	18.50	17.75
Gray forge, Pittsburgh	19.26	19.26	19.76	19.01
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04
Ferromanganese, furnace	90.00	90.00	90.00	88.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	35.00
O.-h. sheet bars, P'gh	33.50	33.50	33.50	36.00
Forging billets, P'gh	39.00	39.00	39.00	40.00
O.-h. billets, Phila	38.30	38.30	39.30	40.30
Wire rods, Pittsburgh	42.00	42.00	42.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.80	1.80	1.85	2.00
Steel bars, Chicago	2.00	2.00	2.00	2.10
Steel bars, New York	2.14	2.14	2.14	2.34
Tank plates, Pittsburgh	1.80	1.80	1.80	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.10
Tank plates, New York	2.09	2.09	2.09	2.24
Beams, Pittsburgh	1.80	1.80	1.80	2.00
Beams, Chicago	2.00	2.00	2.00	2.10
Beams, New York	2.04	2.04	2.09	2.34
Steel hoops, Pittsburgh	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago, district is 61c. per ton.

Sheets, Nails and Wire,	July 5, 1927	June 28, 1927	June 7, 1927	July 6, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	3.00	3.00	3.00	2.95
Sheets, black, No. 24, Chicago dist. mill	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, P'gh	3.85	3.85	3.85	3.80
Sheets, galv., No. 24, Chicago dist. mill	3.95	3.95	3.95	3.95
Sheets, blue, 9 & 10, P'gh	2.25	2.25	2.25	2.30
Sheets, blue, 9 & 10, Chicago dist. mill	2.35	2.35	2.35	2.40
Wire nails, Pittsburgh	2.50	2.50	2.50	2.65
Wire nails, Chicago dist. mill	2.55	2.55	2.55	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.20	3.20	3.20	3.35
Barbed wire, galv., Chicago dist. mill	3.25	3.25	3.25	3.40
Tin plate, 100 lb. Box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$14.75	$14.75	$15.00	$16.25
Heavy melting steel, Phila.	14.00	14.00	14.00	15.00
Heavy melting steel, Ch'go	12.00	12.00	12.00	14.00
Carwheels, Chicago	13.50	13.50	13.50	16.50
Carwheels, Philadelphia	15.00	15.00	15.50	17.00
No. 1 cast, Pittsburgh	15.00	15.00	15.50	15.50
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	17.00
No. 1 RR. wrot, Phila.	16.00	16.00	16.00	16.50
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	11.00	13.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$2.90	$2.75
Foundry coke, prompt	4.00	4.00	4.00	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.62½	12.62½	12.87½	14.00
Electrolytic copper, refinery	*12.25*	12.37½	12.50	13.62½
Zinc, St. Louis	*6.15*	6.22½	6.25	7.22½
Zinc, New York	*6.50*	6.57½	6.60	7.57½
Lead, St. Louis	*6.02½*	6.15	6.10	8.00
Lead, New York	*6.30*	6.40	6.45	8.25
Tin (Straits), New York	*64.50*	66.00	68.00	62.62½
Antimony (Asiatic), N. Y.	*12.00*	12.25	12.75	14.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Mills Show Stronger Resistance to Pressure Against Prices as Output Dips

PITTSBURGH, July 5.—The second half of the year is starting much more quietly in the steel market than the first half, for while demand did not begin to assume respectable proportions until about the middle of February, manufacturers had a clearer idea of their customers' six months' requirements than they have at present. Consequently, they cannot produce as confidently in anticipation of orders as they did in the opening month of the year.

The general market is quiet. The mid-year period usually is a slack one, but in 1926 the dip was so small and was so short-lived that this year, which has been more in conformity with other years, appears to be worse than it actually is by comparison with average conditions. In several of the past six years the rate of iron and steel production has been lower around the Fourth of July than it is this year. Production over the past week has suffered some loss, but it has been due to the intense heat rather than to any material lessening of bookings, which for the past few weeks have shown very little variation.

Fewer blast furnaces are active now than at any other time this year, but the suspensions recently simply are a belated adjustment of pig iron production to the smaller requirements for steel-making, as only one of the eight furnaces that have been banked or blown out in the past week or two has been a merchant stack.

Weather conditions, vacations and the natural indisposition of people to work as actively in the summer as in other seasons of the year usually affect the production of steel and in addition there is the close-range buying habit of consumers, but the present rate of output suggests some doubt as to what is ahead, as does the common trade opinion that no real betterment is likely in business before September. It is accepted that the oil industry will provide comparatively little well pipe tonnage during the remainder of the year, and improvement in railroad buying is not regarded as definitely assured. There continues to be uncertainty as to the purchasing ability of the farmers, and a definite line upon the power of the motor car industry to absorb steel is not yet to be had.

Prices are giving signs of somewhat greater stability than was noted over much of the first half of the year. Mills in the various producing districts of the country cannot ship plates, shapes and bars much beyond their natural territories without encountering stiff competition and, as has been true for a long time, the best returns to the mills have been on nearby business. With sheet consumption equal to only about 75 per cent of productive capacity, prices are unusually firm, and while little or no nail, barbed wire and staple business has been entered at the advance recently announced, there is a good deal of earnestness in the insistence of the mills on the new prices. Deviations from ruling strip steel prices have not been uncovered, although order books are shrinking and new demands are light.

The situation in the primary materials is without new features, except for a slight stiffening in a few grades of scrap, due to the fact that water shipments of Detroit scrap to Buffalo melters have forced some buying by Ohio consumers, who formerly got most of the Detroit production.

Pig Iron.—Interest in the market on the part of melters remains very low. The Richmond Radiator Co., Uniontown, Pa., recently closed in New York for about 5000 tons of foundry iron. In recent years, much of the iron used at that plant has been supplied from Pittsburgh's lone merchant furnace, but this purchase was made from a western Pennsylvania steel company, with a freight rate of $1.64 to Uniontown, against $2.27 from the Valley furnaces. The foundry iron in the stock of the Pittsburgh furnace is reported to have been sold to a middle interest at $17.25, Valley furnace basis, for No. 2 grade and 50c. per ton more for the No. 2X iron. Such business as has been done in Valley furnace iron has been at the prices of a week ago.

W. P. Snyder & Co. make the June average price of Bessemer iron from Valley furnaces $18.90 and of basic $17.86, as compared with $19.18 and $18.20 respectively in May.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.50
Bessemer	18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.00
Low phosphorus, copper free	$27.50 to 28.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Bars, Plates and Shapes.—The interesting development of the past week lies not in any material increase in demand, but rather in a little more resistance by the mills to pressure against prices. The Pittsburgh district market on these products is still quotable at 1.80c. to 1.85c., base Pittsburgh, and there is no evidence that bars and plates are going at less than the lower price even to the so-called preferential buyers. Mills are less successful in getting 1.85c., base, on large shapes in small lots than on small tonnages of bars and plates. If the local fabricating shops had enough local business to keep busy without going into other parts of the country for orders, they would offer less resistance to mill prices on plain material, but in going far afield they must overcome the freight advantage of the shop nearest the job and that means a good deal, since there is no longer much difference between mill prices at Pittsburgh and those in the East, at Chicago or at Birmingham. It is said that mill costs have been reduced all they can be without reducing wages, which is a step no manufacturer wants to take; hence, the tendency is to take a stronger stand on prices. Iron bars are not very active, and desirable business undoubtedly would bring out lower prices.

Rails and Track Supplies.—Local producers have not yet observed any appreciable quickening in new business, although some of the standard-section rails and track accessories now pending will undoubtedly be placed in this market. Prices are steady.

Tubular Goods.—The comparison between business taken this year and last year is still unfavorable, because a comparatively good half year in line pipe, particularly for gas lines, has not offset the loss of tonnage in standard-weight and oil well pipe. But a number of makers find satisfaction in the fact that shipments have been well up to the average of the past three years and also point out that present production of around 60 to 65 per cent of capacity is equal to more than 80 per cent of the capacity of 1923. Since four years ago capacity has expanded by at least 30 per cent, and there will be a further increase soon, as the Jones & Laughlin Steel Corporation will have its seamless pipe mill going by the end of this year and the Bethlehem Steel Corporation soon will be a factor in welded pipe, as its new mill at Sparrows Point is about ready to start. This additional capacity will mean a thinner spreading out of the business and considerable restraint upon the part of manufacturers if prices are to hold. It is fully realized that productive capacity is ample, and there are reports that instead of building new seamless mills two companies now producing welded pipe will try to acquire companies now producing seamless pipe. The Phillips Petroleum Co., which recently acquired the Oklahoma Natural Gas Co., has plans for a 200-mile 22-in. gas line to run from Amarillo, Tex., to Oklahoma City and nearby Oklahoma points. There is plenty of gas-line pipe pending, but not much has been placed lately. Fairly good demand is noted for boiler tubes, but not much activity is seen in mechanical tubing.

Sheets.—There is a very steady demand for sheets, but neither individually nor in the aggregate are orders so large as to result in any strain on productive capacity. Mill backlogs are moderate, and since there is no great pressure for deliveries, no shortage of supplies is developing, notwithstanding the fact that mill operations are rather low this week on account of the holiday and the heat. Prices are firm.

Tin Plate.—Hot weather has taken some toll of production, but it is also believed to have helped the crops, the size of which has an important bearing on the consumption of tin plate. Manufacturers are little disturbed by the temporary letdown in output, which comes at a time when there is not much real pressure for shipments.

Cold-Finished Steel Bars and Shafting.—There is a fairly steady flow of small-lot orders, with consumers, both large and small, disposed to purchase only what they see a need for. The ruling market price is 2.30c., base Pittsburgh.

Ferroalloys.—New business in the commonly used ferroalloys amounts to little, and, in keeping with the fact that steel works operations have been affected by a lighter demand for finished steel products, specifications on contracts have decreased. Prices are unchanged.

Semi-Finished Steel.—Youngstown makers of sheet bars have announced a price of $34, Youngstown, on third quarter tonnages, and a fair amount of business has been written at that price. The Pittsburgh market, which is a very limited one in this form of semi-finished steel, is hardly quotable at any less than the Youngstown market, since Youngstown and other outside mills, in shipping to or toward Pittsburgh and basing the sale at Pittsburgh, would have considerable freight to absorb. Only two of the independent sheet makers in the Pittsburgh district buy their sheet bars, and one of them has a continuing arrangement with another company through an interlocking of directors.

The Iron Age Composite Prices

Finished Steel

July 5, 1927, 2.367c. a Lb.

One week ago	2.367c.
One month ago	2.374c.
One year ago	2.431c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.339c.,	April 26
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

July 5, 1927, $18.71 a Gross Ton

One week ago	$18.71
One month ago	19.04
One year ago	19.59
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$18.71,	June 28
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.80c. to 1.85c.
F.o.b. Chicago	2.00c.
Del'd Philadelphia	2.12c. to 2.17c.
Del'd New York	2.14c. to 2.19c.
Del'd Cleveland	1.99c. to 2.04c.
F.o.b. Cleveland	1.80c. to 1.85c.
F.o.b. Birmingham	1.95c. to 2.05c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.80c. to 1.90c.
F.o.b. Birmingham	1.95c. to 2.05c.

Rail Steel

F.o.b. mill	1.65c. to 1.80c.
F.o.b. Chicago	1.90c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.75c. to 1.85c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	1.90c. to 2.05c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.07c. to 2.17c.
Del'd New York	2.09c. to 2.19c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.75c. to 1.85c.
F.o.b. Chicago	2.00c.
F.o.b. Birmingham	1.90c. to 2.05c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	1.92c. to 2.12c.
Del'd New York	1.99c. to 2.14c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.30c.
All gages, 6 in. to 12 in., P'gh	*2.10c.
Nos. 13 and 14 gage, 12 in. to 14 in., P'gh, net	2.30c.
Nos. 15 and 16 gage, 12 in. to 14 in., P'gh, net	2.40c.
All gages, narrower than 6 in., Chicago	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago	2.20c. to 2.50c.

*Mills follow plate or sheet prices according to gage on wider than 14 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., f.o.b. P'gh mill	3.25c.
Strips, under 12 in., f.o.b. Cleveland mills	3.25c.
Strips, under 12 in., delivered Chicago	3.55c.
Strips, under 12 in., f.o.b. Worcester mill	3.40c.
Stripsheets, 12 in. and wider, Pittsburgh mill	3.00c.
Stripsheets, 12 in. and wider, Cleveland mill	3.00c.
Stripsheets, 12 in. and wider, Chicago mill	3.30c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.50 to $2.55
Galv'd nails	4.50 to 4.55
Galvanized staples	3.20 to 3.25
Polished staples	2.95 to 3.00
Cement coated nails	2.50 to 2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	$3.20 to 3.25
Barbed wire, painted	2.95 to 3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.35c.
Nos. 9 and 10, del'd Philadelphia	2.57c.
Nos. 9 and 10, f.o.b. Birmingham	2.35c. to 2.45c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	3.00c.
No. 24, f.o.b. Ch'go dist. mill	3.10c.
No. 24, del'd Philadelphia	3.32c.
No. 24, f.o.b. Birmingham	3.10c. to 3.15c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.10c.
No. 24, f.o.b. Pittsburgh, B grade	4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.85c.
No. 24, f.o.b. Chicago dist. mill	3.95c.
No. 24, del'd Philadelphia	4.17c.
No. 24, f.o.b. Birmingham	3.95c. to 4.05c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.25c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.20c. to 4.30c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C.	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers		Base Per 100 Lb.
2100*	(½% Nickel, 0.10% to 0.20% Carbon)	$3.90
2300	(3½% Nickel)	$4.20 to 4.30
2500	(5% Nickel)	5.25 to 5.50
3100	(Nickel Chromium)	3.20 to 3.90
3200	(Nickel Chromium)	4.75 to 5.00
3300	(Nickel Chromium)	7.00 to 7.25
3400	(Nickel Chromium)	6.25 to 6.50
5100	(Chromium Steel)	3.20 to 3.30
5200*	(Chromium Steel)	7.00 to 7.50
6100	(Chrom. Vanadium bars)	4.10 to 4.30
6100	(Chrom. Vanad. spring steel)	3.80
9250	(Silicon Manganese spring steel)	3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.)	4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.)	4.10 to 4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.)	4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.)	3.30 to 3.40
	Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum)	4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to 38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅜ in. and larger	$2.80 to $3.00
Spikes, ⅓ in. and smaller	2.80 to 3.15
Spikes, boat and barge	3.25
Tie plates, steel	2.35
Angle bars	2.75
Track bolts, ⅞ in. and ⅞ in.	3.90 to 4.00
Track bolts, ¾ in. and smaller, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3½ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

Other tin plate and sheet companies that do not make their own bars are supplied by the Carnegie Steel Co. on terms that are not made public. Large billets and slabs hold at $33, Pittsburgh, but there is not much activity. There are sales of forging billets at $40, base, but the more common price is $39. Wire rods are commonly quoted at $43, base Pittsburgh or Cleveland, and a few small sales are reported at that price. Skelp is inactive and nominal at 1.80c. to 1.85c.

Wire Products.—Makers seem to have been successful in restoring the prices of those products in which competition had brought about recessions. On new orders all mills in this district are now asking $2.55, base per keg, Pittsburgh, for nails in jobbers' carloads, and although few if any of the current shipments carry that price, there is no evidence that less is being accepted on fresh purchases. Business generally is quiet, as it usually is at this time of the year.

Hot-Rolled Flats.—Late specifications on second quarter contracts for hot-rolled strips have provided makers with enough business to see them through the first half of the month, but they are preparing for a quiet second half, as strictly new business is light. It is not expected that the motor car builders will get into production on their new models much before the first of September, and this means that there will probably not be much buying of strips during the next 30 days. The demand for hoops and bands is moderate and strictly hand-to-mouth. Prices are holding.

Cold-Rolled Strips.—With the tapering of automobile production has come a smaller demand for cold-rolled strips, dullness in which is also due to the fact that some other consumers have been able to take fairly heavy shipments on second quarter contracts and now have comfortable inventories. Makers see a good operation over the first half of this month in the completion of specifications on second quarter contracts, but look for light operations for the 30 days beginning about the middle of the month. There are no deviations from ruling quotations.

Fluorspar.—On domestic gravel spar $18 per net ton at mines has become merely an asking price on small lots, and on worthwhile tonnages $17.50 is now the common maximum, while large users rarely are called on to pay more than $17.

Bolts, Nuts and Rivets.—Third quarter contracts are large, but specifications against them, as well as on the business carried over from the second quarter, are moderate. There is close adherence to the price schedule, notably on large rivets, which even large buyers cannot break, while the buyers who purchase supplies as they need them are finding makers stiff at $3, base per 100 lb.

Coke and Coal.—Third quarter contracting for furnace coke has been completed with the placing of the requirements of two Valley furnaces. One of them closed with a Youngstown steel company for by-product coke and the other placed a contract with a Connellsville producer. The tonnage of the two furnaces amounts to approximately 30,000 tons a month. The by-product coke went at about 15c. a ton less than the ruling price on Connellsville coke, which has been $3.25 per net ton at ovens. In some cases this was a flat price, and in others it carried a wage clause, providing for an advance or reduction in keeping with any change there may be in Connellsville wage scales. The spot furnace coke market is still quoted at $3 for small tonnages up to $3.25 for large ones. Spot foundry coke ranges from $4 to $4.50 for good brands and up to $5.35 for choice brands. The spot coal market is still dull and weak, and not much interest is noted in future supplies, although it is reported that stocked coal is beginning to fire in a good many places and to save it owners are drawing more heavily on it than recently. The strike situation presents no change, but there is a fairly common belief that the real effect of the suspension is yet to be seen.

Old Material.—This market to some extent is feeling the effect of the movement of scrap by water from the Detroit district to Buffalo. Eastern Ohio steel companies, unable to secure as much of the supply of the Detroit district as formerly, are obliged to turn elsewhere to obtain their requirements. Users of compressed and bundled sheets lately have found them hard to obtain, and something of a scarcity also exists in machine shop turnings. Dealers want as much as $15 and even $15.25 for compressed sheet scrap and $12.50 for machine shop turnings, but have been able to develop no bids that high. Heavy melting steel is hard to sell at over $15, and since it usually commands a premium of $1 a ton over compressed sheets, it is not easy to convince buyers that the latter are worth the same price. It is evident, however, that compressed sheets cannot be bought at as low as $14, nor is $10.50 any longer possible on machine shop turnings. Other grades are quotable at the prices of a week ago, but the undertone of the market is firmer, for while consumer interest is low, dealers sense a better demand in the next 30 or 45 days and are beginning to prepare for it.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.00 to 14.25
Compressed sheet steel	14.50 to 15.00
Bundled sheets, sides and ends	13.50 to 14.00
Cast iron carwheels	15.00 to 15.50
Sheet bar crops, ordinary	14.50 to 15.00
Heavy breakable cast	14.50
No. 2 railroad wrought	14.50 to 15.00
Heavy steel axle turnings	13.50 to 14.00
Machine shop turnings	11.50 to 12.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.00
Railroad coil and leaf springs	16.75 to 17.00
Rolled steel wheels	16.75 to 17.00
Low phosphorus billet and bloom ends	19.00 to 19.50
Low phosphorus, mill plate	18.50 to 19.00
Low phosphorus, light grade	16.75 to 17.00
Low phosphorus sheet bar crops	18.50 to 19.00
Heavy steel axle turnings	13.50 to 14.00
Electric Furnace Grades:	
Low phosphorus punchings	17.00 to 17.50
Heavy steel axle turnings	13.50 to 14.00
Blast Furnace Grades:	
Short shoveling steel turnings	10.50 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.50 to 11.00
No. 2 busheling	10.50 to 11.00
Rolling Mill Grades:	
Steel car axles	19.00 to 19.50
No. 1 railroad wrought	11.00 to 11.50
Cupola Grades:	
No. 1 cast	15.00 to 15.50
Rails 3 ft. and under	17.00 to 17.50
Malleable Grades:	
Railroad	14.50
Industrial	14.00
Agricultural	13.50

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.60c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count,	62½ per cent off list
Machine bolts, per 100 count.	62½ per cent off list
Carriage bolts, per 100 count.	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb	2.90
Wire, galvanized soft, base per 100 lb	2.90
Common wire nails, per keg	$2.80 to 2.90
Cement coated nails, per keg	2.85 to 2.95

Symposium for Spring Meeting of Electrochemists

The spring meeting in 1928 of the American Electrochemical Society will be held at Bridgeport, Conn. "The Chemical Production of Electricity," the subject suggested by William H. Finkeldey of the New Jersey Zinc Co., was selected by the board as the symposium topic for this meeting. The subject covers not only primary and secondary batteries, but also electrolytic rectifiers and condensers.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾-in.	$33.50 to 34.00
Forging, ordinary	39.00 to 40.00
Forging, guaranteed	44.00 to 45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$33.50 to $34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	$33.50 to 34.00

Skelp

	Per Lb.
Grooved	1.80c. to 1.85c.
Sheared	1.80c. to 1.85c.
Universal	1.80c. to 1.85c.

Wire Rods

	Per Gross Ton
*Common soft, base	$42.00 to $43.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $42.50 to $44. Cleveland mill base, $42 to $43.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.50c.
Iron ore, Swedish, average 66% iron,	9.75c. to 10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $11.50
	Per Gross Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.50
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$3.00 to $3.25
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.00
Foundry, by-product, Newark or Jersey City, delivered	9.59 to 10.77
Foundry, Birmingham	5.50
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.30 to $1.90
Mine run coking coal, f.o.b. W. Pa. mines	1.70 to 1.90
Mine run gas coal, f.o.b. Pa. mines	2.00
Steam slack, f.o.b. W. Pa. mines	1.25
Gas slack, f.o.b. W. Pa. mines	1.40 to 1.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$90.00
Foreign, 80%, Atlantic or Gulf port, duty paid	90.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$34.00
Domestic, 16 to 19%	33.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$34.00	12%	$38.00
11%	36.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$26.50	10%	$32.00
7%	27.50	11%	34.00
8%	28.50	12%	36.00
9%	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	$1.00 to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$17.00 to $18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	———
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Southern Railway Buys 42,000 Tons of Rails—Two Blast Furnaces Put Out

CHICAGO, July 5.—Notwithstanding that sales of steel last week were the best so far this year with the exception of the week ended April 9, production in the Chicago district continues to taper and now has reached between 70 and 75 per cent of ingot capacity. The Steel Corporation has further reduced blast furnace operations by blowing out the No. 7 stack at South Chicago and No. 6 at Gary, leaving 15 active out of its 27 furnaces in this section. The Inland Steel Co. is blowing four stacks at the moment but expects to take a furnace out of service within the next 10 days. Counting all steel works furnaces in this area 23 out of 36 remain in blast.

After jumping 100 per cent a week ago, new inquiry has expanded still further and for the week just closed was 30 per cent ahead of the last seven days in June. By far the largest proportion of sales, specifications and new inquiries is confined to small lots and represents the immediate requirements of buyers.

Railroads are actively in the market for miscellaneous steel tonnages, many of which will be used for the maintenance of rolling stock. Two large railroad equipment orders have been placed rather unexpectedly, one being for 1000 box cars and the other for 500 refrigerator cars. The bulk of outstanding rail inquiry is still open and active, and Chicago producers now count on 50,000 to 60,000 tons being placed here.

Pig Iron.—Buyers' interest in third quarter iron has waned, and most inquiries and sales range from 100 to 200 tons each. Both individual inquiries and purchases are more numerous than heretofore, supporting the belief of sellers that buying for the next 60 days will be at frequent intervals and in small lots. Using shipments as a gage, there is little indication of a change in the volume of melt, though the foundry business is spotty and somewhat uncertain in trend from week to week. In Chicago and north of here $20 is the going price for Northern iron. At Peoria and Moline, Ill., producers to the south have named prices that figure back to $19.50, Chicago. The silvery market is without feature, and only a few scattered carlot purchases of charcoal iron have been made.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sil. 1 to 2 per cent, copper free	$31.50 to 32.00
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—On the whole this market is quiet, and prices are unchanged. A few scattered sales of spiegeleisen have been made at $42.76, delivered, for the 19 to 21 per cent grade. Specifications for ferrosilicon are of moderate size.

Prices delivered Chicago: 80 per cent ferromanganese, $97.56; 50 per cent ferrosilicon, $85 to $87.50; spiegeleisen, 18 to 22 per cent, $41.76 to $42.76.

Plates.—Railroad car orders requiring 22,000 tons of steel have been placed during the week. The outstanding award was made by the Chicago & North Western, which placed 500 box cars with the General American Car Co. and an equal number with the Standard Steel Car Co. The Pressed Steel Car Co. has taken an order from the North American Car Co. for 500 refrigerator cars and another from the Great Northern Railway for 250 70-ton gondola cars. Additional inquiries for oil tankage have come into the market, bringing the total of pending business up to 10,000 tons. Steel specifications against the cars recently ordered by the Illinois Central are now reaching producers, and rolling schedules are better balanced, particularly on universal mills. The price situation has changed only slightly since a week ago. In Oklahoma and other sections of the Southwest orders are being taken at 1.90c., Chicago, and the same prices are being named in the St. Louis district and in competitive territory east of this city. One user north of Chicago has succeeded in placing two carloads of plates at $2 under the general market. On the whole, the market has not been tested, orders usually being for small tonnages and in mixed lots. Buyers have been approached with the proposal that if their orders exceed 2000 tons and if they will issue immediate specifications, the price will be 1.90c., Chicago. As a general rule, however, users are reluctant to commit themselves heavily and continue to buy at short range at 2c., Chicago.

Mill prices on plates per lb.: 2c., Chicago.

Rails and Track Supplies.—The Southern Railway has ordered 41,000 tons of standard-section rails from the Tennessee Coal, Iron & Railroad Co. and 1000 tons from a Chicago mill. The accessories to go with these rails, about 12,000 tons, have not yet been awarded. Outstanding rail inquiry now stands at 135,000 tons, and the trade is still looking forward to an inquiry from the Chesapeake & Ohio for upwards of 35,000 tons. Miscellaneous orders for track supplies placed with Chicago mills include 20,000 kegs of spikes and bolts and over 4000 tons of tie plates. Light rails are dull, but it has been intimated that users are in need of tonnage and that they will make their wants known as soon as there is assurance that the end of the coal strike is at hand.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36 to $38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Structural Material.—The city of Chicago has placed a contract with the American Bridge Co. for a bascule bridge across the Chicago River at Twelfth Street, calling for 2000 tons. Several awards of 500 tons each have been made, and some promising inquiries, notably one for 2300 tons for a highway bridge across the Mississippi River at Quincy, Ill., are before the trade. With shop capacity only partly engaged, competition for going business is keen and prices are unusually low. The market lacks a real test, inasmuch as buyers still prefer to buy from hand to mouth. However, several users have been approached by sellers with an offer of 1.90c., Chicago, on orders for 2000 tons or more for immediate specification.

Mill prices on plain material per lb.: 2c., Chicago.

Cast Iron Pipe.—With the single exception of an impending purchase by Detroit of 1344 pieces of 4-in. to 24-in. fittings, there is no public business of note in the pipe market. Several cities have deviated from their former practice by placing pipe orders through contractors, the tonnage called for being of fair size. Several large orders have been placed recently by municipalities in Colorado and Texas. Locally, however, activity is confined to business of carlot or smaller proportions. Prices are nominal at $34 to $35, base Birmingham, or $42.20 to $43.20, delivered, for 6-in. and larger diameters. One sale of a carload brought $35.35, base Birmingham, or $43.55, delivered Chicago. Small contracts are in good number, but the aggregate tonnage placed falls far short of current shipments and foundry backlogs have dropped to an average of three weeks. Although buying has been delayed, the trade expects purchases of pipe for summer delivery to reach a fair total. Contractors are busy and are taking deliveries as promptly as foundry schedules will permit. Kenosha, Wis., will take bids July 9 on 166 tons of 16-in. Class B pipe. Norwalk, Wis., will take alternate general contractors' bids July 12 on 12,000 ft. of 6-in. and 2400 ft. of 4-in. or 8-in.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $42.20 to $43.20; 4-in., $46.20 to $47.20; Class A and gas pipe, $4 extra.

Sheets.—Hot weather during the last half of last week cut sheet mill output at least 15 per cent, and since July 4 was observed as a holiday, production for the first 10 days of this month will make a poor show-

ing. New business is of sufficient volume to keep mills booked for about two weeks ahead. There is little change in the character of demand, orders being ordinarily small and for shipment at the earliest convenience of mills. The roofing trade is still fairly active, and numerous orders are being received from manufacturers of light tanks and containers. Chicago delivered prices are holding at 3.15c. for black, 4c. for galvanized and 2.40c. for blue annealed sheets.

Prices per lb., delivered from mill in Chicago: No. 24 black, 3.15c.; No. 24 galvanized, 4c.; No. 10 blue annealed, 2.40c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bars.—The demand for soft steel bars in this district is equal to about 80 per cent of mill capacity. The decline in business during the past three or four weeks is not the result of a letdown in any one or two lines of consumption but reflects reduced activity on the part of virtually all classes of users. Forgers, who were unusually early in May, have slackened their pace, and manufacturers of automobile accessories are finding business at a lower level than in late May and early June. Manufacturers of farm machinery on the other hand are greatly encouraged over the agricultural outlook and, in addition to issuing larger specifications for current consumption, are anticipating their late summer and early fall requirements. Mill prices on soft steel bars are unchanged at 2c., Chicago. In iron bars both new business and specifications are larger, and for the first time in weeks mills are operating on a well arranged rolling schedule. Mill prices on bar iron are holding at 2c., Chicago. There is practically no change in the alloy steel bar market. Prices are steady, third quarter contracting has been fully up to expectations, and output in this district averages close to 85 per cent of capacity. Specifications for rail steel bars are running slightly ahead of production, which continues on a double turn basis at both Chicago Heights mills. Orders in the main are small and numerous, emanating from virtually all classes of users. Barn equipment makers are still fairly active, considering the lateness of the season, and the bed industry is slowly picking up. The demand from the manufacturing trade and dealers in hard steel reinforcing bars has been so insistent that mills are behind in laying away stock for fall shipments of fence posts. Mill prices of rail steel bars are steady at 1.90c., Chicago.

Mill prices per lb.: Soft steel bars, 2c., Chicago; common bar iron, 2c., Chicago; rail steel bars, 1.90c., Chicago.

Old Material.—A steel producer has purchased 5000 to 10,000 tons of heavy melting steel from brokers at delivered prices ranging from $12.50 to $12.75 per gross ton. Here and there a small user of scrap has come to the conclusion that prices are at, or near, the bottom, and there appears to be more willingness at least to discuss prices on requirements for the next 30 to 60 days. In some few instances buyers' stocks ran low at the turn of the half year inventory period, and dealers look for some buying because of that situation. The present low level of prices is attractive to sellers who have old orders, and there is more activity in covering past obligations than has been noticeable for a number of weeks. Railroad shipments are being absorbed, with the result that distress tonnage is giving little or no trouble. At the same time manufacturers producing scrap are becoming dissatisfied with the low prices now offered and are beginning to accumulate old material for a higher market. The Burlington list that closed last week brought out prices above the general level of the market. Railroad malleable brought $14.40 per gross ton, delivered; No. 1 rerolling rails, $15.20 per gross ton, delivered, and No. 1 wrought, $11.80 per net ton, delivered. New railroad lists include 35,000 tons, offered by the Pennsylvania; 5000 tons, by the Chicago & North Western, and 2200 tons, by the Chicago, Milwaukee & St. Paul.

Prices delivered consumers' yards, Chicago:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel	$12.00 to $12.50
Shoveling steel	12.00 to 12.50
Frogs, switches and guards, cut apart, and miscellaneous rails	13.00 to 13.50
Hydraulic compressed sheets	10.00 to 10.50
Drop forge flashings	9.25 to 9.75
Forged, cast and rolled steel car-wheels	14.25 to 14.75
Railroad tires, charging box size	14.50 to 15.00
Railroad leaf springs, cut apart	14.50 to 15.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.25 to 14.75
Coil springs	14.75 to 15.25
Low phosphorus punchings	14.50 to 15.00
Electric Furnace Grades:	
Axle turnings	11.75 to 12.25
Blast Furnace Grades:	
Axle turnings	10.00 to 10.50
Cast iron borings	9.75 to 10.25
Short shoveling turnings	9.75 to 10.25
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	14.75 to 15.25
Cupola Grades	
Steel rails, less than 3 ft	15.00 to 15.50
Angle bars, steel	13.00 to 13.50
Cast iron carwheels	13.50 to 14.00
Malleable Grades	
Railroad	13.50 to 14.00
Agricultural	13.50 to 14.00
Miscellaneous	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades	
Iron angle and splice bars	13.50 to 14.00
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	20.00 to 20.50
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	5.75 to 6.25
Locomotive tires, smooth	13.75 to 14.25
Pipes and flues	7.00 to 7.50
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	13.25 to 13.75
Stove plate	12.50 to 13.00
Grate bars	11.50 to 12.00
Brake shoes	10.00 to 10.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—Among awards this week is 360 tons of rail steel bars for the Engineers' Building, Chicago, and the outstanding new local project is the Dorchester Apartments, calling for 600 tons. On the whole, both lettings and inquiry are holding up well for this time of the year. Several shops have fair backlogs, and new business holds close to current shipments. A pending list as large as the one now before the trade would ordinarily lend some support to prices. The fear, however, that many jobs may not be financed leads to keen competition for going tonnages. In rail steel reinforcing bars as low as 2c. per lb., Chicago, has been named on lots as small as 25 tons each, while attractive tonnages have brought still lower prices. Billet steel bars range from 2.15c. to 2.35c., Chicago warehouse, and in one case 2.05c. has been accepted on a

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Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.15c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	$2.85 to 2.95
Cement coated nails, base per keg	2.95

New York

Liberal Sheet Contracting at New Prices —Cast Pipe and Scrap Weak

NEW YORK, July 5.—Sales of pig iron by local brokers during the week totaled 6000 tons. In addition 5000 to 6000 tons, mainly No. 2 plain foundry but including some No. 2 X, was bought by the Richmond Radiator Co. for its Uniontown, Pa., plant. At least a part of this business went to the Johnstown producer, and the delivered price quoted is understood to have been equivalent to $17.50, Valley furnace, or better. The American Engineering Co., Philadelphia, has entered the market for 250 tons each of No. 2X and No. 1X for the current quarter. Otherwise new inquiries are confined to small lots. Mid-year inventories, which for some melters will not be completed until July 11 or 12, have tended to hold up buying as well as shipping instructions. On the other hand, an increasing number of the smaller buyers who have formerly contracted by quarters are now buying in small tonnages for early shipment. The operations of foundries are spotty, but there are indications that there is no longer a general tendency toward reduced melt. Prices on foundry iron remain unchanged at $17 to $17.50, base Buffalo, and at $20 to $20.50, base eastern Pennsylvania furnace. Although occasional water shipments from Buffalo are made at as low as $2.25 per ton, the ruling barge rate to New York harbor is $2.50, making delivered prices of $19.50 to $20 alongside docks. The unloading charge is 20c. a ton and the insurance 5c. For deliveries in Jersey City the switching charge is 76c., but for other points between Jersey City and Philadelphia from $1.13 to $1.64 per ton must be added for rail delivery. The barge rate from Troy, N. Y., is $1 a ton.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$21.91 to $22.41
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits N. Y. and Brooklyn)	19.50 to 20.00
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—Demand for both ferromanganese and spiegeleisen is confined to carloads and small lots. There have been a few sales as well as inquiries. Prices are unchanged at $34 for spiegeleisen and $90 for ferromanganese. Specifications for all ferroalloys are not as intensive as they were a few weeks ago.

Finished Material.—Comparatively heavy buying of sheets during the last two weeks with no price concessions reported has made those products the brightest spot in a somewhat dull market. The three-day holiday accounted for the lull in the last week, but prospects for the next two months are exceedingly uncertain, the most to be expected being a continuance of the placing of small orders. June was considered a rather good month by most of the mill representatives in this territory, and in some cases the first half ran ahead of the similar period last year. Price concessions still are heard of on bars, shapes and plates. Large tonnages of plates no longer command more than 1.75c., Pittsburgh, but smaller lots are still being sold at 1.80c. Efforts are being made by some of the mills to hold the bar price at 1.80c., Pittsburgh. Structural lettings for June were at a good rate, and more than 10,000 tons are called for in new projects which have come out in the New York metropolitan territory in the last week. Competition is very keen on large jobs, and 1.65c., Pittsburgh, is becoming more common. The demand for butt-weld pipe is being maintained at a fair rate, but there has been some falling off from the heavy rush of orders occasioned by the end of the plumbers' strike. Hot and cold-rolled strip steel is holding at the recently established prices, and there has been enough forward contracting to give the market a firm tone. The price of wire nails has been advanced $1 a ton to 2.55c., Pittsburgh, but the change will have little or no effect upon third quarter buying, as consumers were largely covered at the old quotation.

Mill prices per lb. delivered New York: Soft steel bars, 2.14c. to 2.24c.; plates, 2.09c. to 2.19c.; structural shapes, 1.99 to 2.14c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices continue soft, and although $35 per ton, base Birmingham, or $44.25 per net ton, delivered New York, continues to be a fair estimate of the present market, recent lettings have brought out prices $1 to $2 per ton lower when the business was at all desirable. Current demand for bell and spigot pipe is limited to small lots to complete installations begun in the spring, and with fall buying still a month or more away, the market is rather inactive. The Mason & Hanger Co., New York, is expected to

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	5.75c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	50 to 50 and 10
1 x 30 in. and smaller	45 to 50
Carriage bolts, cut thread:	
½ x 6 in. and smaller	50 and 10 to 60
¾ x 20 in. and smaller	50 to 50 and 5
Coach screws:	
½ x 6 in. and smaller	50 and 10 to 60
1 x 16 in. and smaller	50 to 50 and 5

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
⅜-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	4	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

close some time next week on several hundred tons of pipe for the Fulton Street subway and tunnel under the East River. The 1500 tons for Baranquilla, Colombia, has not yet been awarded.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $43.25 to $45.25; 4-in. and 5-in., $48.25 to $50.25; 3-in., $58.25 to $60.25; Class A and gas pipe, $5 extra.

Reinforcing Bars.—Lettings in metropolitan territory during the last week totaled nearly 2000 tons for large jobs alone, and small orders were taken at a fair seasonal rate. A warehouse in Long Island City, for which estimates are being prepared, will require approximately 1000 tons. The New York warehouse price on lots of more than 2 tons has been reduced $2 a ton to 3.05c. per lb., delivered at job, but 3.15c. is still being quoted on smaller jobs. The mill price and Youngstown warehouse price had both been reduced previously and are unchanged.

Prices per lb. on billet steel reinforcing bars: From mill, 1.90c., Pittsburgh. Out of New York warehouse, 3.05c. to 3.15c., delivered at job. Out of Youngstown warehouse, 2.40c., Youngstown, or 2.77½c., delivered New York.

Coke.—Buying is still limited to small lots, and prices are unchanged at $4.25 to $4.75 per net ton, Connellsville, for standard foundry and at about $3.25 for standard furnace coke. Delivered prices of Connellsville foundry coke are: To northern New Jersey, $8.28 to $8.78; New York or Brooklyn, $9.04 to $9.54; Newark or Jersey City, N. J., $8.16 to $8.66 per net ton. By-product foundry coke continues at $9.59 to $10.77 per net ton, delivered to Newark or Jersey City.

Warehouse Business.—Demand is spotty. The latter part of June showed sufficient improvement to partly offset the poor business in the early weeks of the month, bringing the total volume of business almost up to the May level. Purchasing of plates and sheets is fairly large and there is a continued demand for small lots of structural material. Prices are unchanged except for a tendency to offer concessions to secure desirable orders, particularly in the case of black and galvanized sheets.

Old Material.—Buying prices on No. 1 heavy melting steel have been reduced 50c. a ton for delivery to a Bethlehem, Pa., consumer, so that $13.50 per ton, delivered eastern Pennsylvania, is now the current market. Blast furnace material continues unchanged at $10.25 per ton, delivered Bethlehem, Pa., and $10.50, delivered Sparrows Point, Md. Consumers of rails for rolling show little interest in purchasing at present, and brokers are in some instances shipping rerolling rails on No. 1 heavy melting steel orders, taking the 50c. deduction made on old rails. Specification pipe is being bought at $12 per ton, delivered Lebanon, Pa., following a recent purchase by a consumer at $12.50 per ton, and stove plate is being bought at $12 per ton, delivered Phoenixville, Pa., based on a consumer purchase at $12.50 per ton. Railroad lists about to be opened will bring a considerable tonnage of scrap into the market. A Baltimore & Ohio list, opened July 5, includes about 25,000 tons, and a Pennsylvania Railroad list, opening July 6, totals about 42,000 tons. Further offerings include the Erie Railroad, July 7; the Central Railroad of New Jersey, July 8; and the Lehigh Valley and Delaware, Lackawanna & Western lists, opening next week.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	6.75 to 7.00
No. 1 heavy breakable cast	10.75 to 12.50
Stove plate (steel works)	7.50 to 8.50
Locomotive grate bars	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
Short shoveling turnings	6.75 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	6.75 to 7.50
Steel car axles	15.75 to 16.25
Iron car axles (nom.)	23.00 to 23.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.25 to 8.75
Forge fire	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought, long	10.50 to 11.00
Rails for rolling	10.50 to 11.25
Cast iron carwheels	10.75 to 11.25
Stove plate (foundry)	8.50 to 9.75
Malleable cast (railroad)	10.75 to 11.25
Cast borings (chemical)	12.00 to 13.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$14.00 to $14.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	12.50 to 13.00
No. 2 cast (radiators, cast boilers, etc.)	11.50 to 12.00

Philadelphia

Large Tonnage of Heavy Melting Scrap Sold at $14—Iron and Steel Dull

PHILADELPHIA, July 5.—The usual dullness of a holiday period has marked the iron and steel business of this district in the past week. The only event of importance was the purchase by a steel company of a large tonnage of heavy melting steel scrap at $14, delivered, representing a decline of 50c. a ton as compared with its previous large purchase.

Steel companies selling in this district ended June with somewhat better tonnage figures than was expected; in some cases the totals ran ahead of May but did not equal those of June of last year. While mid-summer last year was a period of unusual activity, the signs now point to the opposite for the next two months at least. In pig iron, as well as in steel, orders are fewer and for smaller tonnages. Foundry pig iron continues available at $20.50 to $21, furnace, for the base grade, but is not strong even at those figures. In finished steel the price situation shows practically no change—plates, shapes and bars show weakness, while sheets, strip steel and bolts, nuts and rivets are in a firm position.

Pig Iron.—With sales at a very low level, the pig iron market is again in one of those periods of dullness which have been rather more frequent of late than the periods of activity. The Pusey & Jones Corporation, Wilmington, Del., has bought 500 tons of iron of a special grade and the American Engineering Co. is inquiring for 500 tons of foundry iron, but aside from these tonnages the business done or in prospect has consisted of small lots, usually for early shipment. The holding up of shipments by some foundries which have a smaller melt than a month or two ago has increased the amount of iron available for sale. Low phosphorus iron has been sold at $25, Eastern furnace, for shipment to the Pittsburgh district with a freight rate of $6.08.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 23.26
Basic (delivered eastern Pa.)	20.75
Gray forge	21.00 to 21.50
Malleable	22.00 to 22.50
Standard low phos. (f.o.b. New York State furnace)	25.00
Copper bearing low phos. (f.o.b. furnace)	24.50 to 25.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.67
Virginia No. 2X, 2.25 to 2.75 sil.	27.17

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $5.17 from Virginia furnaces.

Plates.—Operations at Eastern plate mills have shown a slight further reduction. The amount of business received in the last week of June was slightly larger than in preceding weeks of the month, but present schedules will easily take care of this. Fol-

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.80c. to 3.00c.
Plates, ⅛-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	2.70c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.35c.
Galvanized sheets (No. 24)	5.20c.
Blue annealed sheets (No. 10)	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

lowing the Fourth of July holidays the amount of business received today was small. Ordinary lots are being sold at 1.80c. and 1.85c., Pittsburgh, with 1.75c. the usual figure on the larger tonnages.

Structural Shapes.—There have been very few lettings of structural steel buildings in this district in the past week or two, and only a comparatively small amount of work is in prospect. While some of the structural mills still have a fair volume of specifications against contracts taken some time ago, others are feeling the decline in building operations. The amount of business in the past week has been extremely light. The price situation has not changed. Ordinary quotations are 1.75c. and 1.80c., Pittsburgh, with concessions on the larger tonnages.

Bars.—Miscellaneous orders for steel bars are being booked by the mills at both 1.80c. and 1.85c., Pittsburgh. Deliveries are being made quickly, and orders for a carload or less predominate. Eastern mills quote bar iron at 2.12c., Philadelphia.

Sheets and Strips.—The third quarter has opened with no apparent signs of a break in the prices of sheets and hot and cold-rolled strip steel. While very few contracts have been made, buyers are now paying the new prices without question. The tonnage is in reduced volume, but otherwise business is on a basis more satisfactory to the mills than at any recent time.

Imports.—Steel imports were conspicuous in last week's receipts from abroad at Philadelphia. The total was upward of 900 tons as follows: Blooms from France, 573 tons; blooms from Sweden, 16 tons; bars from France, 46 tons, bars from Belgium, 58 tons; strips from England, 4 tons; structural shapes from Germany, 113 tons; shapes from Belgium, 127 tons. Other imports were 30 tons of ferromanganese and 50 tons of spiegeleisen from England.

Old Material.—An Eastern steel company bought a large tonnage of heavy melting steel last week at $14, delivered, a decline of 50c. a ton as compared with its previous sizable purchase. The brokerage company which took the order reduced its offering price to $13.50. Another steel company bought machine shop turnings at $10.50, bundled sheets at $10, stove plate and grate bars at $12.50 and No. 2 steel scrap at $11.50. In the case of turnings, stove plate and grate bars these prices were an advance of 50c. a ton.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.00
Scrap T rails	13.50
No. 2 heavy melting steel	$11.50 to 12.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	10.00
Machine shop turnings (for steel works)	10.50
Heavy axle turnings (or equivalent)	12.50 to 13.00
Cast borings (for steel works and rolling mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50
Railroad grate bars	12.50
Stove plate (for steel works)	12.50
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
No. 1 blast furnace scrap	10.00 to 10.50
Machine shop turnings (for rolling mill)	10.50 to 11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50
Shafting	18.00 to 18.50
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 11.50
Steel rails for rolling	16.00
Cast iron carwheels	15.00 to 15.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	15.00 to 16.00

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 3.00c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-rolled strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.65c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base, per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

New Automobile Models Expected to Bring More Business to the Mills

CLEVELAND, July 5.—Mills are getting a moderate volume of business in steel bars, plates and structural material for July shipment. Orders are as a rule for small lots to round out stocks. With curtailed operations by some of the consuming industries and the usual summer lull, little improvement in the demand is expected during July and August.

The volume of business in several of the mill products in this territory during the next few weeks will be measured largely by the activity in the automotive industry, which starts the last half of the year in a spotty condition. Some of the motor car builders in Michigan are beginning the month with good production, and it is expected that a number of new models that will be brought out shortly will keep several plants busy for some time to stock up dealers and, at the same time, will stimulate retail sales. On the other hand, it is reported that the output of a few of the automobile companies has been in excess of their sales. Interest is still centered in the Ford Motor Co., which evidently has not yet commenced to place any round lots of steel for its new models.

Inquiry in the structural field is less active than recently. Awards during the week include 5000 tons placed by a public service company in Detroit. Prices are steady. Steel bars are firm at 1.80c. per lb., base Pittsburgh, for good orders and at 1.85c. for small and miscellaneous lots. Plates and structural material are commonly quoted at 1.80c., although some of the mills are holding to 1.85c. for small lots. The Cleveland mill price on steel bars ranging from 1.80c. to 1.85c., Cleveland.

Pig Iron.—While the market does not show a great deal of life, sales in the past week were about equal to those during the previous week or two. Very little new inquiry is pending. Third quarter starts with many foundries not covered for their requirements beyond what they have carried over from the second quarter. While some are buying on a monthly basis, a few are covering for the entire last half, evidently feeling that prices are as low as they will go. It is expected that the price trend in the next few weeks will be controlled by the amount of surplus pig iron the steel industry has to place on the market. Business generally is slack in the jobbing foundries, and shipments have been curtailed, as many foundries that shut down for the holiday will not resume until July 11. A favorable feature of the market is the fact that large specifications are coming from some of the automobile manufacturers. Buying is almost at a standstill in the Cleveland territory, purchases being confined to other sections of the State and to Indiana and Michigan. Lake furnace prices in the outlying districts are irregular, depending on the amount of freight the seller must absorb to meet competition. While $17.50 is the ruling quotation locally for foundry and malleable iron for outside shipment, this price is being shaded and differentials are being waived for delivery to some points. In Michigan the price range is unchanged at $18.50 to $19, furnace.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$19.00
Southern fdy., sil. 1.75 to 2.25	24.00
Malleable	19.00
Ohio silvery, 8 per cent	31.50
Basic, Valley furnace	17.50
Standard low phos., Valley fur	27.50

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Semi-Finished Steel.—Some contracts are being placed for the third quarter at $34, Cleveland, for sheet bars and at $33 for large billets and slabs, and the same prices are being quoted by Youngstown producers, f.o.b. mill. Consumers are specifying rather closely for early requirements.

Sheets.—Mills received good specifications during the week from two or three Michigan automobile companies, mostly for automobile body sheets for July and

early August shipment. There is not much new demand, but regular prices are being well maintained. Due to a slack demand, irregularity has developed in tin mill black plate, on which concessions to 3c., Pittsburgh, have been reported. Tin mills are also competing with sheet mills for material in the range of sizes they can roll, offering black sheets on a tin mill base equivalent to 2.90c., Pittsburgh, for black sheets.

Strip Steel.—Some small-lot orders for cold-rolled strip steel are being placed at present prices, but consumers are buying only for immediate needs and are still attempting without success to secure concessions. Many consumers are still getting shipments on low-priced contracts. Hot-rolled strip is firm.

Warehouse Business.—Jobbers report an improved demand for sheets. Other lines are moving fairly well. Galvanized sheets have been advanced $3 a ton. Prices on steel bars, plates and structural material are unchanged, although there is talk of a reduction.

Reinforcing Bars.—The local market is weak, and jobbers are quoting close to 2c. for good orders of billet steel bars for stock shipment. Rail steel bars are unchanged at 1.65c., mill.

Bolts, Nuts and Rivets.—Makers are closing a satisfactory volume of contracts for the third quarter at ruling prices. While specifications are rather light, it is said that they are up to the average for the usual dull summer period. Rivet makers report that they are able to get $3, base, for small lots of large rivets from non-contracting consumers.

Iron Ore.—Shipments of Lake Superior ore by water during June amounted to 8,458,925 tons, a decrease of 311,626 tons as compared with June last year. However, June shipments showed a considerable gain over May, when the total moved was 7,752,471 tons. Shipments are well ahead of last year, totaling 17,771,482 tons up to July 1, a gain of 2,877,683 tons over the same period last year. This gain was due to the unusually early start this season. The heavy early season movement is resulting in a slowing down in shipments, and additional boats that have been engaged in the ore trade will be taken out of commission this month.

Coke.—With the starting of its 120 new by-product coke ovens, the Ford Motor Co., Detroit, will have considerable surplus coke and is entering the merchant by-product coke field in that territory. The Ford coke in foundry and domestic grades will be available for shipment after July 15. It is expected to find a market in northern Indiana and northwestern Ohio, as well as in Michigan. Foundry coke is inactive, with no change in the price range of $4.25 to $5.35, ovens, for standard Connellsville brands. Ashland by-product foundry coke is unchanged at a $6.50, Connellsville, basis for July shipment. Heating coke is weak for prompt shipment, distress fuel being offered at $2.40 to $2.50, ovens. Contract prices range from $2.75 to $3.

Old Material.—A small tonnage of blast furnace scrap was purchased at $11, delivered, by a Cleveland steel plant during the week. This is the same price that was paid by this consumer two weeks previously. The market is holding at recent quotations, and prevailing prices are not bringing out as much material as a few weeks ago. This is evidently largely due to the decrease in scrap production. Mills still have fair stocks, and some are holding up shipments of heavy melting steel. Consumers are limiting their purchases to early needs, and not much activity is looked for during the next 60 days.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.50 to $14.00
No. 2 heavy melting steel	13.00 to 13.25
Compressed sheet steel	13.00 to 13.25
Light bundled sheet stampings	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
Machine shop turnings	8.75 to 9.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.75 to 14.00
No. 1 busheling	11.50 to 11.75
Pipes and flues	10.00 to 10.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.00 to 16.50
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10.25 to 10.50
Mixed borings and short turnings	10.25 to 10.50
No. 2 busheling	10.25 to 10.50
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	12.00 to 12.50
Stove plate	12.00 to 12.50
Rails under 3 ft.	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.50 to 16.00
Rails for rolling	16.25 to 16.50

Metallurgy of Manganese

Pyrometallurgy is now the only practical method in vogue for extracting metallic manganese from its ores, says the United States Bureau of Mines, in Information Circular 6034. As manganese is highly volatile at the temperature required to reduce it to the metallic state, smelting losses are extremely high, and materially increase the cost of the reduced metal. As is well known, the steel maker uses it in the form of spiegeleisen, a blast furnace product containing about 20 per cent manganese, and in the form of ferromanganese of various grades, up to 80 per cent manganese. For special alloys, low carbon analyses are available. Electric furnace ferromanganese is now being imported in considerable quantity.

In the manufacture of steel, no satisfactory substitute for manganese is known. In Germany during the years 1917 and 1918 the shortage of manganese necessitated trial of many substitutes, such as aluminum in the form of silicon-aluminum alloys. Aluminum has a greater affinity for oxygen than manganese, but the oxidization of aluminum produces alumina which is relatively infusible and often remains in the steel as slag inclusion, declares the Bureau of Mines. Aluminum cannot eliminate sulphur or change the condition of sulphur as manganese can. A slight excess of aluminum tends to produce large pipes in the ingots.

Silicon in the form of ferrosicilon probably has a greater affinity for oxygen than manganese, but according to the same authority its use is attended by the following disadvantages: In slight excess it causes large pipes to form in ingots; the products of oxidation remain in the steel; it has no effect upon sulphur and no effect on the molecular arrangement of the metal. Ferrotitanium is the most powerful deoxidizer known. Titanium does not alloy freely with iron and has not been widely accepted by the trade.

For high manganese low carbon irons and for non-ferrous alloys, metallic manganese would be used. To produce metallic manganese, the ore must be smelted at a high temperature and a strong reducing action maintained. As this method reduces any iron in the ore, the resultant metal is an alloy of manganese and iron. Metallic manganese therefore requires specially pure ores, low in iron.

The Goldschmidt process, which is based upon the thermit reaction, is used to produce metallic manganese. In it, pure mangano-manganic oxide mixed with aluminum is used. The powdered aluminum is incorporated with the oxide and the mixture is brought to the required temperature. The amount of aluminum used is based on the total oxygen content of the purified manganese oxide, and is sufficient to produce sesquioxide of aluminum. Silicon, in place of aluminum, is also successfully used as a reducing agent in the commercial manufacture of metallic manganese.

Steel Goes by Boat to Chicago from Buffalo

CHICAGO, July 5.—The Bethlehem Steel Co. has docked a boat at South Chicago, which is unloading about 400 tons of steel rolled at Buffalo. The vessel made stops at Duluth and Milwaukee and discharged steel at both places. It may load scrap at Milwaukee for the return trip to Buffalo.

San Francisco

Coast Fabricating Awards Exceed First Half Totals for 1926 and 1925

SAN FRANCISCO, July 2 (*By Air Mail*).—While lettings of fabricated steel, reinforcing bars and cast iron pipe have been more numerous, two conspicuous features of the week's business have been the paucity of fresh inquiry and the apparent firmness of Eastern mill quotations. Despite a continued contraction of demand, Eastern mills, except in a few isolated instances, have shown little disposition to shade prices on the heavier steel products. However, it is open to question whether this indicates anything more than an attitude of watchful waiting on the part of the mills.

On the Pacific Coast during the first half, lettings in fabricated steel, as reported to the San Francisco office of THE IRON AGE, totaled 126,252 tons, against 119,969 tons in the corresponding period of last year and 114,048 tons in the first half of 1925. In reinforcing bars, awards reported during the past six months totaled 25,765 tons, against 20,000 tons in the first half of 1926 and 36,734 tons in the corresponding period two years ago. In cast iron pipe, public lettings so far this year total 50,345 tons, against 35,300 tons in the opening half of 1926 and 45,000 tons in the corresponding period of 1925.

Pig Iron.—During the week a local importer received a shipment of about 300 tons of Indian iron, and an additional cargo of equal tonnage is expected to arrive at this port within the next fortnight. Locally sales are light and inquiries are unimportant. While quotations are unchanged and reports of price shading lack confirmation, it is understood that a number of price concessions have been made recently in both domestic and foreign irons.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings of fabricated structural steel during the week total 1769 tons. Fresh inquiry is unimportant. The largest individual award, 500 tons for an apartment building in San Francisco, was taken by Dyer Brothers, local fabricators. It is understood that a contract for 1000 tons for a bridge at Lee's Ferry, Ariz., will be awarded to the Kansas City Structural Steel Co., Kansas City, Mo., the low bidder. The cost of the project is understood to exceed the appropriation made by the State of Arizona, and arrangements have been made whereby the Coconio County board of supervisors has agreed to pay the cost of building approaches to the bridge. Eastern mills quote plain material at 2.35c., c.i.f. Coast ports.

Plates.—The Standard Oil Co. of California, San Francisco, is taking bids on 150 tons. In Riverside, Cal., the Baker Iron Works, Los Angeles, is low bidder on 340 tons for a pipe line; alternate bids were taken on 227 tons of Matheson-joint pipe, on which N. O. Nelson, Los Angeles, is low bidder. Inquiries are confined to small tonnages, and even these are not numerous. Eastern mills quote 2.30c., c.i.f. Coast ports.

Bars.—Lettings of reinforcing bars during the week total about 800 tons. The largest individual letting, 260 tons for the Southside School, San Francisco, was taken by a local jobber. Fresh inquiry is light. The Navy Yard at Mare Island, Cal., placed 159 tons with the Pacific Coast Steel Co., San Francisco. The largest pending inquiry locally is 400 tons for the East Bay Municipal Utility District, Oakland, Cal., on which bids will be opened July 15. Local jobbers' quotations on reinforcing bars are unchanged, but price concessions are frequent. For general business, however, quotations are as follows: 2.75c. to 2.85c., base, per lb. on lots of 200 tons and 3c. to 3.10c., base, on less-than-carload lots.

Cast Iron Pipe.—Public lettings during the week placed through private contractors include the following: Tacoma, Wash., 1350 tons of 6 to 18-in. Class B pipe; Redondo Beach, Cal., 125 tons of 16-in. Class B pipe; San Diego, Cal., 881 tons of 6 to 16-in. Class C pipe for the Linda Vista Water Development project, and 100 tons of 2 to 6-in. Class B pipe for improvements in Texas Street. In Tucson, Ariz., G. Knox Corbett is low bidder on 2330 tons of 6 to 12-in. Class B pipe. Fairview, Ore., will open bids July 11 on 162 tons of 2, 4 and 6-in. Class B pipe.

Steel Pipe.—Rialto, Cal., is taking bids on 113 tons of standard pipe. No award has been made as yet in Los Angeles on 162 tons of standard pipe on which the Standard Pipe & Supply Co. is low bidder.

Coke.—A cargo of English and German coke is expected at this port during the next week or 10 days, and another shipment is due here early in September. There has been a slight falling off in demand locally during the past week. Quotations are as follows: English beehive fuel is $17 per net ton at incoming dock, English by-product coke is $13, and German by-product is $11.50 to $12.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Small angles, ⅞-in. and over	3.00c.
Small angles, under ⅞-in.	3.40c.
Small channels and tees, ¾-in. to 2¾-in.	3.60c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.35c.
Common wire nails, base per keg	$3.75
Cement coated nails, 100-lb. keg	3.75

Boston

Fourth Quarter Pig Iron Bought— 11,400 Tons of Scrap Moving to Italy

BOSTON, July 5.—Pig iron sales in New England in the past week totaled close to 5000 tons, of which the Mystic Iron Works booked approximately 3000 tons. The orders called mainly for No. 2 plain, No. 2X and No. 1X foundry. The increased buying is ascribed in part to what is believed to be the beginning of fourth quarter covering. Bookings for fourth quarter, however, are confined to furnaces east of Buffalo, which are taking business for that period at prices prevailing today. Competition between these furnaces is still keen, and they are making attractive prices where the freight rate is $2 a ton or more. Prices on Buffalo iron are easier; on No. 2 plain and No. 2X quotations of $18, Buffalo, have disappeared from the market. One Buffalo furnace is reported to have taken No. 1X iron in the Providence, R. I., district at $17.50 a ton at furnace, or $22.41, delivered. Quotations of $17.50, Buffalo, on No. 2X iron, however, are still out of line with prices named by furnaces east of Buffalo. Recent bookings include a little western Pennsylvania iron, bought for

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

mixture purposes. No open inquiries of importance are reported in the market, but a fair amount of prospective business is coming to the surface.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.91
Buffalo, sil. 2.25 to 2.75	22.41
East. Penn., sil. 1.75 to 2.25	$23.65 to 24.15
East. Penn., sil. 2.25 to 2.75	24.15 to 24.65
Virginia, sil. 1.75 to 2.25	27.42
Virginia, sil. 2.25 to 2.75	27.92
Alabama, sil. 1.75 to 2.25	24.91 to 26.77
Alabama, sil. 2.25 to 2.75	25.41 to 27.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.92 from Virginia, $6.91 to $8.77 from Alabama.

Coke.—As anticipated a week ago, the New England Coal & Coke Co. and the Providence Gas Co. on July 1 announced that there would be no change in their price on by-product foundry coke, which is $12 a ton, delivered, within a $3.10 freight rate zone. Shipments by these ovens in the past week increased perceptibly, and both companies have good orders for early July delivery. The improved demand is taken as an indication that the low point in demand has been passed for 1927. Good Connellsville foundry coke is available at $5 a ton at ovens, or $10.50, delivered; yet New England foundries manifest little interest in that fuel.

Shapes and Plates.—Local fabricators will figure on a new Providence, R. I., theater and store building, calling for more than 1000 tons of steel, but plans have not been received. Otherwise no large tonnages are in prospect. Fabricators are figuring on a large amount of small business, which will swell backlogs sufficiently to carry some plants through the summer. Standard shapes are generally quoted at 1.75c. per lb., base Pittsburgh, while plates range from 1.70c. to 1.80c., with the latter the most common quotation. Consumers are buying only for immediate requirements, owing to the unsettled condition of prices.

Warehouse Business.—Following closely the announcement by warehouses of the establishment of quantity differentials on certain iron and steel products, notice is now given that "toncan" sheet prices have been advanced 1c. per lb. over galvanized, making the price on No. 28 gage 8.15c. per lb, on three or more bundles, as against 7.15c. for galvanized. Warehouses experienced a spurt in shipments just before the holiday. Consumers, however, are buying in small quantities and only for immediate requirements. Competition from certain foreign rolled products continues very keen.

Old Material.—Local interest in old material centers very largely in yard steel. Exporters are still paying $8.50 a ton on dock here for such scrap. The steamer Emperor of Montreal has practically finished loading 4500 tons for Genoa and will herself be scrapped after unloading. Another steamer is loading 6900 tons for Italy, making a total of 11,400 tons for export, by far the largest tonnage of scrap to be moved out of New England in many months. There is no activity in other grades of scrap, although a little interest is being shown in bundled skeleton and forged flashings.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.50
Scrap rails	8.50 to 9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	5.00 to 5.50
Cast iron borings (steel works and rolling mill)	5.50 to 6.00
Bundled skeleton, long	5.50 to 6.00
Forged flashings	6.00 to 6.50
Blast furnace borings and turnings	5.50 to 6.00
Forged scrap	6.00 to 6.50
Shafting	13.50 to 14.00
Street car axles	15.00 to 15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.00 to 8.50
Rails for rerolling	10.50 to 11.00
Cast iron borings, chemical	10.50 to 11.00

Prices per gross ton, delivered consumers' yards:

Textile cast	$15.00 ot $15.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	12.00 to 12.50
Railroad malleable	14.50 to 15.00

Buffalo

Further Weakness Shown by Plates, Shapes and Bars

BUFFALO, July 5.—Inquiry for pig iron is light, with no large tonnages pending. Most of the 3000 tons of No. 2 plain and No. 2X bought by the Richardson & Boynton Co. for its Dover, N. J., plant is said to have been placed with the Troy, N. Y., furnace. A few small tonnages of foundry and malleable are being placed from time to time at $17.50, base Buffalo. Large lots, it is understood, can be placed at a lower price, but $17.50 seems to be firmly held on most of business now being booked. One order for 1000 tons of foundry was placed during the week at $17.50. Scattering tonnages bring the week's bookings up to 8000 or 9000 tons.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00 to $17.50
No. 2X foundry, sil. 2.25 to 2.75	17.50 to 18.00
No. 1X foundry, sil. 2.75 to 3.25	18.50 to 19.00
Malleable, sil. up to 2.25	17.00 to 17.50
Basic	17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Demand for sheets is fair, with prices steady at 3c., base Pittsburgh, for black; 3.85c. for galvanized, and 4.25c. for automobile body. Sheet mill operations are at 80 per cent of capacity. Open-hearth output at the other mills has been cut to between 65 and 70 per cent. On bars, plates and shapes 2.065c., Buffalo, is being done, with 2.015c. possible on some tonnages. Business in bolts and nuts is good, with prices firm. Demand for standard pipe has declined, and the operations of mills supplying this district range from 65 to 70 per cent. Structural fabricators are figuring on a school at Kenmore, N. Y., calling for 250 tons.

Old Material.—The largest consumer of No. 1 machinery cast and stove plate has recently made a purchase of several thousand tons, which will put it out of the market for several months. Open-hearth output is being reduced at some of the steel mills, and this is expected to have the effect of further softening the market. Heavy melting steel is quiet.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.00
No. 2 heavy melting steel	14.00 to 14.25
Scrap rails	14.50 to 15.00
Hydraulic compressed sheets	12.75 to 13.25
Hand-bundled sheets	9.50 to 10.00
Drop forge flashings	12.75 to 13.25
No. 1 busheling	13.00 to 13.25
Heavy steel axle turnings	13.75 to 14.00
Machine shop turnings	9.00 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Rolled steel wheels	16.00 to 16.50
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	13.75 to 14.00
Short shoveling steel turnings	10.75 to 11.00
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	10.75 to 11.00
No. 2 busheling	11.00 to 11.50
Rolling Mill Grades	
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	14.25 to 14.75
Stove plate	13.00 to 13.50
Locomotive grate bars	11.00 to 11.50
Steel rails, 3 ft. and under	17.00 to 17.50
Cast iron carwheels	15.00 to 15.50
Malleable Grades	
Railroad	15.50 to 16.00
Agricultural	15.50 to 16.00
Industrial	15.50 to 16.00

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb.	3.90

Toronto

Dominion Holiday Interrupts Buying—Fair Contracting for Pig Iron

TORONTO, ONT., July 5.—Important transactions have been lacking in the Canadian pig iron market during the past week. With business in this country brought practically to a standstill, owing to the celebrating of Canada's diamond jubilee on July 1, and with Saturday also proclaimed a holiday throughout the Dominion, there was very little interest shown in the market during the last few days of June. It is estimated that slightly over 60 per cent of those who contract for their quarterly needs have come forward, and recent inquiries indicate that the first couple of weeks of July will see virtually all of the remainder covered. A steady spot demand for foundry and malleable iron has been a feature of the market for some time past, and while this was not quite so pronounced during the month of June as in earlier months this year, it was decidedly better than in the corresponding month last year. With foundries and other consumers operating almost at capacity, blast furnace representatives look for a good demand for pig iron during the next three months. It is generally believed that more Ontario consumers will take advantage of the low water freight rates to lay in winter stocks than has been the case in any former year. No steps have been taken to revise prices, which remain firm.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$24.10
No. 2 foundry, sil. 1.75 to 2.25	24.10
Malleable	24.10
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	26.50
No. 2 foundry, sil. 1.75 to 2.25	26.50
Malleable	26.50
Basic	25.50
Imported Iron at Montreal Warehouse	
Summerlee	36.00
Carron	36.00

Old Material.—Until the effect of the holiday has passed, there is little prospect for market activity. Small-tonnage buying has been the only feature of an otherwise stagnant market. While a small number of large consumers have placed contracts, less than 40 per cent have covered their future needs. Some inquiries have been received which indicate that additional third quartr contracts will be closed, but taken as a whole the bulk of current business is coming from those who adhere to the hand-to-mouth buying policy. Trading between dealers has also fallen into a slump during the past few days.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$10.50	$9.00
Rails, scrap	11.00	10.00
No. 1 wrought	11.00	14.00
Machine shop turnings	8.00	7.50
Boiler plate	8.00	8.00
Heavy axle turnings	8.50	8.50
Cast borings	8.50	7.50
Steel turnings	8.00	8.00
Wrought pipe	6.00	6.00
Steel axles	15.00	17.00
Axles, wrought iron	17.00	19.00
Per Net Ton		
No. 1 machinery cast	16.00	18.00
Stove plate	10.00	13.00
Standard carwheels	14.00	16.00
Malleable scrap	14.00	14.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.80c.
Galvanized sheets (No. 24)	5.35c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

St. Louis

Largest Pig Iron Sales in Months—Scrap Grades Advance

ST. LOUIS, July 5.—With sales of pig iron totaling 28,000 tons, the bookings of the Granite City maker during the week were the largest in several months. The largest order of the week was 10,000 tons of basic iron from a St. Louis district melter, while an Illinois company bought 7500 tons of foundry grades. Other Illinois consumers bought 1500 tons of malleable, and the remainder of the business was in scattered lots of from 100 to 1000 tons. Purchases were made conservatively by melters who ordinarily would have bought much larger quantities. Although some consumers have been withholding shipping instructions, deliveries during the month have been well maintained. Prices are unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00 to $20.50
Northern No. 2 fdy., delivered St. Louis	22.16
Southern No. 2 fdy., delivered	22.42
Northern malleable, delivered	22.16
Northern basic, delivered	22.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—The market for coke continues quiet, with prices for both industrial and domestic grades unchanged. Dealers are disinclined to stock domestic grades.

Finished Iron and Steel.—Five municipal projects, general contracts for which have been or are about to be awarded, will require between 3000 and 3500 tons of reinforcing bars. Orders for the steel are expected to be placed within the next week. These projects have been listed in THE IRON AGE. The Granite City steel works is now operating at about 78 per cent of capacity and, in view of heavier orders for tin plate and galvanized sheets, will probably increase output to 85 per cent of capacity within the next week. Warehouse business is dull.

Old Material.—Items such as miscellaneous standard-section rails, steel car axles and railroad malleable, have advanced 50c. a ton and No. 1 locomotive tires and cast iron borings are up 25c. a ton, while the remainder of the list is unchanged but stronger. Railroad lists that closed during the week brought better prices. New railroad offerings include: Pennsylvania, 48,000 tons; Baltimore & Ohio, 22,000 tons; Chicago, Milwaukee & St. Paul, 7000 tons; Missouri Pacific, 3500 tons, and Mobile & Ohio, 1100 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$10.75 to $11.25
No. 1 locomotive tires	14.50 to 15.00
Heavy shoveling steel	10.75 to 11.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	13.00 to 13.50
Railroad springs	13.50 to 14.00
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	14.00 to 14.50
Rails for rolling	13.75 to 14.25
Machine shop turnings	6.75 to 7.25
Steel car axles	18.50 to 19.00
Iron car axles	23.00 to 23.50
Wrought iron bars and transoms	18.50 to 19.00
No. 1 railroad wrought	12.00 to 12.50
Steel rails, less than 3 ft.	15.50 to 16.00
Steel angle bars	11.75 to 12.25
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	12.00 to 12.50
No. 1 railroad cast	15.00 to 15.50
Agricultural malleable	11.50 to 12.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Hickman, Williams & Co., Detroit, have been appointed sole agents for the sale of surplus coke produced at the Fordson plant of the Ford Motor Co., Detroit. The motor company has just completed 120 coke ovens, giving it a total of 240 ovens with a monthly output of approximately 105,000 tons.

Birmingham

Two Blast Furnaces to Blow Out —Demand for Steel Shrinks

BIRMINGHAM, July 5.—In the pig iron market no buying movement for third quarter has developed. There is still pressure for deliveries of foundry iron and many of the smaller melters have bookings that warrant steady operations for several weeks, but there are no indications of any deviation from the hand-to-mouth policy of buying pig iron that has prevailed for some time. Among the larger melters the local radiator plant is operating virtually at capacity, but other users are carefully watching their yard stocks in view of declining backlogs. Stove plants and jobbing foundries are buying pig iron in lots ranging up to 300 and 500 tons, but larger sales are exceptional. Nine blast furnaces in Alabama are producing foundry iron, eight are on basic and two on special iron. The Tennessee Coal, Iron & Railroad Co. has changed the output of one of its Ensley stacks from basic to foundry. Two blast furnaces are scheduled to be blown out this month, but four others will be ready to go in on short notice, among them a local stack of the Sloss-Sheffield Steel & Iron Co., which has been rebuilt, now having a rated capacity of 400 tons a day.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil...	$18.00
No. 1 foundry, 2.25 to 2.75 sil...	18.50
Basic	18.00
Charcoal, warm blast	29.00

Rolled Steel.—Reduction in steel production may not come to a halt until next month, but in the meantime plans for improvements and betterments at mills and shops will be carried out. Structural steel fabricators report a slight gain in operations and there is a fair demand for plates and sheets, but generally new business in finished steel is light. The lighter forms of finished products are inactive. Mill prices on finished steel are unchanged.

Cast Iron Pipe.—The recent reduction in prices of pressure pipe to a range of $34 to $35, Birmingham, for 6-in. and larger sizes, has failed to bring out much business. Production, however, is still at a satisfactory rate, and stocks of pipe on plant yards have been materially reduced. The first shipment has just been made against a several years' contract for culvert pipe for use in highway construction in Cuba.

Coke.—Production is being curtailed as consumption declines. Independent producers of coke, however, have not yet found it necessary to reduce output to any great extent. Foundry coke prices are holding at $5.50 per net ton, Birmingham.

Old Material.—Heavy melting steel remains unchanged at $10.50 to $11, with little new business reported. No. 1 cast shows a weaker tendency, although not enough to warrant a general reduction in prices. The supply of scrap is plentiful.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$10.50 to $11.00
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought	11.00 to 12.00
Rails for rolling	13.00 to 14.00
No. 1 cast	14.00 to 15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.00 to 13.50

Leipzig Fair Dates Announced

The international trade fair, which has been held for centuries at Leipzig, Germany, will be open this year from Aug. 28 to Sept. 3. Some twenty countries will display their products. It is expected there will be over 7000 exhibits.

Visitors are admitted only by invitation, thus to eliminate the mere sightseers. The exhibition has representation in the United States through the Leipzig Trade Fair, Inc., 630 Fifth Avenue, New York.

Cincinnati

Pig Iron Quiet—Big Four Inquiring for Third Quarter Steel

CINCINNATI, July 5.—Quietness characterizes the pig iron market, which is almost devoid of important sales and inquiries. Bookings in the past week totaled less than 4000 tons, and indications are that no improvement will take place in the immediate future. The price situation is unchanged. Furnaces in the Ironton district are asking $19, base furnace, and in a few instances are obtaining 50c. a ton higher on single carload orders. Lake producers are quoting $17.50, base Cleveland, to consumers in this territory and in certain instances are reported to be dipping 25c. a ton under that figure on sizable lots. Jackson County silvery iron, at $28.50, base furnace, for 8 per cent, is showing strength. On Southern iron prices are firm at $18, base Birmingham. The Norfolk & Western Railway has closed for 550 tons of foundry iron with a maker in southern Ohio. A count of the active furnaces in the southern Ohio district reveals three operating on foundry iron, two on silvery and four on basic.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.89
So. Ohio malleable	$20.14 to 20.89
Alabama fdy., sil. 1.75 to 2.25	21.69
Alabama fdy., sil. 2.25 to 2.75	22.19
Tennessee fdy., sil. 1.75 to 2.25	21.69
Southern Ohio silvery, 8 per cent	30.39

Freight rates: $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—The end of the second quarter failed to bring out more than the usual run of specifications and orders. With both bars and structural steel weak, there has been no stimulus to forward buying of those products. Consumers are in a position to get the material that they need within 10 days to three weeks, and under the circumstances it is not surprising that purchases have been confined to small lots covering current requirements. In some cases mills report that at the beginning of a week orders in hand are sufficient to carry them along only for a day or two, but purchases from day to day bring in enough tonnage to maintain manufacturing operations at about 75 per cent of capacity. Agricultural implement makers are more optimistic, and other consuming industries are accepting shipments on contract at a normal rate. Stove manufacturers who supply the Southern trade are going ahead at the best pace in several months. The sheet market in general shows signs of strength. Galvanized stock at 3.85c., base Pittsburgh, is in light demand at the moment, while blue annealed at 2.25c. is firm. Black sheets are selling fairly well at 3c. Bars are less active than a week ago, with prices ranging from 1.80c. to 1.85c., base Pittsburgh. It is only on attractive tonnages, however, that the former figure applies. The wire goods market is steady, and local jobbers are continuing to receive barge shipments from an independent Ironton, Ohio, producer. Common wire nails are quoted at $2.64, delivered in this city. The Big Four railroad is asking for bids on steel locomotive and

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 24)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base 100 lb. keg	2.95
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

car axles, steel tubes and safe ends, common wire nails, woven wire fence and galvanized wire for third quarter delivery. This carrier also is expected to buy about 1100 tons of plates for shipment between July 1 and Sept. 30.

Warehouse Business.—Sales have declined in the past week, the decrease being partly attributed to the extremely hot weather. Demand for bars has been well sustained, but structural steel and sheets have been moving slowly. Thus far, the break in the mill prices on bars, shapes and plates has not affected quotations for delivery from local warehouses.

Coke.—Shipments of by-product foundry coke in June, as compared with May, increased more than 10 per cent, while the movement of domestic grades was unchanged. Prices on by-product foundry coke are unchanged at $7.50 per net ton, f.o.b. ovens, for July, and domestic also will remain at $4.50, ovens. The Portsmouth By-product Coke Co., however, has advanced its quotations 50c. a ton on industrial heating coke at $5, ovens. By-product domestic coke at Detroit has gone up 50c. a ton, with egg and nut bringing $7 and $5.75, ovens, respectively. For local delivery the prices are 50c. a ton higher. A southern Indiana by-product coke company is asking a minimum of $6.65 at its ovens for domestic nut and egg.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—No improvement in demand is noted. Consumers continue to take current shipments on a restricted basis, and in some cases a temporary suspension of further deliveries of material has been requested. Aside from the tonnage offered by railroads, little scrap is coming into the market, dealers preferring to keep their holdings in the expectation of better prices within 30 to 60 days. Quotations on most items are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	12.50 to 13.00
Loose sheet clippings	8.50 to 9.00
Champion bundled sheets	9.50 to 10.00
Cast iron borings	8.50 to 9.00
Machine shop turnings	7.25 to 7.75
No. 1 busheling	9.50 to 10.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.00 to 14.50
No. 1 railroad wrought	11.50 to 12.00
Short rails	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	17.50 to 18.50
No. 1 railroad cast	14.50 to 15.00
Burnt cast	8.50 to 9.00
Stove plate	10.00 to 10.50
Brake shoes	10.25 to 11.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50

Detroit Warehouse Prices Reduced

DETROIT, July 5.—Effective July 1, warehouse prices were reduced $3 per ton on plates, shapes, bars, hoops, bands, blue annealed and galvanized sheets. Cold-rolled strip steel and cold-rolled flat wire show a reduction of $8 per ton. Machine and carriage bolts and cone head rivets show slight reductions, while structural rivets have been advanced 10c. per 100 lb. This is the first revision of warehouse prices since Jan. 15. The new prices are shown in the table.

Warehouse Prices, f.o.b. Detroit

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars	3.00c.
Hoops	4.15c.
Bands, $\frac{7}{16}$-in. and lighter	3.65c.
Black sheets (No. 24)	4.10c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.50c.
Cold-rolled strip steel	5.80c.
Cold-rolled flat wire, $\frac{1}{4}$ in. wide by 0.1 in. and heavier	5.80c.
Rivets, cone head	3.95c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Rivets, tank, $\frac{7}{8}$-in. and smaller	60, 10 and 5
Bolts, boiler fitting up	60

Tariff Commission to Investigate Manganese Situation

WASHINGTON, July 5.—Formal investigation into the manganese situation by the Tariff Commission will begin this week. Acting under its general powers, the commission has ordered that the first part of the broad inquiry be a market study. This is consistent with the plan to emphasize the entire investigation as being principally of an economic nature rather than purely a matter of rates of duty. With this end in view, an engineer, an accountant and an economist will go to New York tomorrow night, where the initial inquiry will relate to imports of manganese ore and ferromanganese and other alloys. After completing the work in New York, this line of study will be extended to other ports of entry along the Atlantic seaboard. The amount of imports, how and where used and other facts will be collected. It is expected to finish this part of the investigation during the present week. The field work then will be concerned with a study of domestic production of manganese ores, the grades used, and also of the production of ferromanganese, the requirements of each, etc. It is estimated that manganese ore consumption amounts to 700,000 tons per year, the great bulk of which is imported. Cost studies also will be made regarding both domestic and foreign ores and alloys.

Germany Modernizing Blast Furnaces

HAMBURG, GERMANY, June 14.—On May 31 there were 112 blast furnaces in operation of a total of 195 in existence. There were 54 under repair, 13 banked and 16 ready to blow in. The decrease in the number of blast furnaces in existence has been considerable as many old furnaces have been dismantled and replaced with fewer but modern furnaces. At the end of May, 1926, there were 211 blast furnaces in Germany, of which 83 were operating; at the end of May, 1925, there were 221 furnaces in existence and at the end of May, 1924, 229 furnaces.

Germany May Increase Electric Steel Output

HAMBURG, GERMANY, June 19.—Production of electric steel in Germany, which showed a sharp increase during the war but declined immediately afterward as a result of the high cost of electricity, is beginning to increase again. Recently the two largest producers of electric power from coal, the Golpa Zschornewitz Co., and the Trattendorf & Lauta Works, in central Germany, merged into the Elektrowerke A. G. The new corporation, which produces its power from cheap brown coal found near the surface, will have a total capacity of 400,000 kw. The greater part of the current produced is being delivered to towns in central Germany at low prices. As these towns are on rivers it is estimated that electric steel produced there could be delivered by water to Hamburg at not more than $1.20 per ton and to Berlin for about 40c. per ton.

Shipments of Sheet Metal Ware

Enameled sheet-metal ware shipped in May is reported by the Department of Commerce at 318,071 dozens, valued at $1,103,693. This compares with 337,181 dozens in April, valued at $1,192,808, and is the smallest month's total of the year.

Galvanized sheet-metal ware was shipped to the extent of 165,287 dozens, valued at $665,808, a sharp reduction of April shipments of 232,496 dozens and $841,902. Production ran ahead of shipments in May, but was below shipments in April.

The corporate name of the St. Louis Coke & Iron Corporation, St. Louis, Mo., has been changed to the St. Louis Gas & Coke Corporation.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	July 5	July 2	July 1	June 30	June 29
Lake copper, New York	12.62½	12.62½	12.62½	12.62½	12.62½
Electrolytic copper, N. Y.*	12.25	12.25	12.25	12.25	12.25
Straits tin, spot, N. Y.	64.50	....	65.62½	65.75	66.12½
Lead, New York	6.30	6.30	6.30	6.40	6.40
Lead, St. Louis	6.02½	6.02½	6.02½	6.15	6.15
Zinc, New York	6.50	6.50	6.50	6.52½	6.55
Zinc, St. Louis	6.15	6.15	6.15	6.17½	6.20

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, July 5.—The Independence holiday season has intensified the inactivity which was already prevalent in most markets. Copper, if anything, is less active and weaker. While buying of tin has been fairly good, quotations are lower. Lead prices have gone lower and zinc has taken a downward trend, with buying of both metals very light.

Copper.—The attempt of producers last week to hold the market for electrolytic copper at 12.62½c., delivered in the Connecticut Valley, did not succeed and the market has reverted to 12.50c. There have, however, been very few tests of the market, demand from consumers being exceedingly light. Those who were willing to buy at 12.50c. a week ago are still holding off, and unless the statistics for June are favorable to producers, prospects are not very bright. This is the third time that the market has reached 12.50c., it having advanced previously from that level. It will take several days to determine the future trend. The official quotation of Copper Exporters, Inc., is unchanged at 13c., c.i.f. Hamburg, and demand from foreign consumers is at a low ebb. Lake copper is quoted at 12.62½c., delivered, but there is not much business.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 12.72c., delivered. The average price of electrolytic copper was 12.37c., refinery, or 12.62c., delivered in the Connecticut Valley.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	67.50c. to 68.50c.
Tin, bar	69.50c. to 70.50c.
Copper, Lake	13.50c.
Copper, electrolytic	13.25c.
Copper, casting	12.75c.
Zinc, slab	7.25c. to 8.25c.
Lead, American pig	7.50c. to 8.50c.
Lead, bar	9.50c. to 10.50c.
Antimony, Asiatic	14.50c. to 15.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	29.00c. to 30.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	42.00c. to 43.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	72.50c.
Tin, bar	74.50c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	8.00c.
Lead, American pig	7.25c.
Antimony, Asiatic	18.00c.
Lead, bar	9.00c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	78.50c.
Solder, ½ and ½	42.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	17.50c. to 18.25c.
Copper, hot rolled	21.25c. to 22.25c.
Copper, cold rolled, 14 oz. and heavier	23.50c. to 24.50c.
Seamless Tubes—	
Brass	22.37½c. to 23.37½c.
Copper	23.25c. to 24.25c.
Brazed Brass Tubes	25.50c. to 26.50c.
Brass Rods	15.25c. to 16.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.00c. to 11.25c.

Tin.—Sales of tin during the week ended with Saturday, July 2, were about 1200 tons distributed approximately as follows: 150 tons on June 27, 400 tons on June 28, 100 tons on June 29, 200 on June 30 and 300 on July 1. The 400 tons on June 28 was taken by consumers for July-August-September delivery, and the 300 tons on July 1 was distributed to consumers for July-October delivery. The feature of the statistics for June was an increase of less than 1000 tons over May in the world's visible supply. This was considerably more than expected and it is likely that July shipments from the Straits will again be heavy. Deliveries of the metal into consumption during June were 5735 tons with 1519 tons in stock and landing on June 30. Imports for the month were 5650 tons of which 3860 tons came from the Straits. Fair sales are reported today with spot Straits tin quoted at 64.50c., New York. London prices today were considerably below those of a week ago, with spot standard quoted at £291, future standard, £282, and spot Straits at £296 per ton. The Singapore price today was £289 5s.

Lead.—The American Smelting & Refining Co. reduced its New York contract price on July 1 from 6.40c. to 6.30c., due, it is thought, to light demand. Quotations in the outside market have correspondingly declined to 6c. to 6.05c., St. Louis, for early delivery. The market is quiet and generally featureless.

Zinc.—Quotations for prime Western zinc have tended downward all the week until today they are nominal at 6.15c., St. Louis, or 6.50c., New York. Ore prices at Joplin continue high at around $42 per ton, with production last week of about 10,000 tons. There is very little demand for the metal from consumers and the decline in the market is something of a surprise under the circumstances.

Antimony.—There is very little activity and Chinese

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products are unchanged at the reduction of June 23. Zinc sheets and lead full sheets are being quoted at the reductions of May 25 and May 16 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	17.50c.
Copper, hot rolled	21.25c.
Zinc	9.75c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	22.37½c.
Copper	23.25c.
Rods—	
High brass	15.25c.
Naval brass	18.00c.
Wire—	
Copper	14.50c.
High brass	18.00c.
Copper in Rolls	20.25c.
Brazed Brass Tubing	25.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.50c.
Copper, hot rolled	21.25c.
Copper, cold rolled, 14 oz. and heavier	23.50c.
Zinc	11.00c.
Lead, wide	10.00c.
Seamless Tubes—	
Brass	23.87½c.
Copper	24.75c.
Brazed Brass Tubes	27.75c.
Brass Rods	15.25c.

metal is quoted at 12c. to 12.12½c., New York, duty paid, for spot delivery, with futures at 12.50c.

Nickel.—Wholesale lots of ingot nickel are being quoted at 35c. per lb., with shot nickel at 36c. and electrolytic nickel at 39c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted in wholesale lots at 25c. to 26c. per lb., delivered.

Non-Ferrous Metals at Chicago

JULY 5.—The non-ferrous market is quiet and prices of tin, zinc and antimony are lower. Old metals are in small demand and prices are weak.

Prices, per lb., in carload lots: Lake copper, 12.75c.; tin, 67.50c.; lead, 6.25c.; zinc, 6.30c.; in less-than-carload lots, antimony 13.50c. On old metals we quote copper wire, crucible shapes and copper clips, 9.75c.; copper bottoms, 8.75c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.75c.; zinc, 3.50c.; pewter, No. 1, 34c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 13.25c.; all being dealers' prices for less-than-carload lots.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.00c.	12.25c.
Copper, heavy and wire	10.75c.	11.75c.
Copper, light and bottoms	9.25c.	10.50c.
Brass, heavy	7.00c.	8.50c.
Brass, light	5.50c.	7.00c.
Heavy machine composition	8.75c.	10.125c.
No. 1 yellow brass turnings	7.50c.	8.25c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	5.00c.	5.625c.
Lead, tea	4.00c.	4.50c.
Zinc	4.00c.	4.25c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	13.50c.	15.50c.

FABRICATED STRUCTURAL STEEL

Awards of 33,300 Tons Include Three Fairly Large Jobs—24,300 Tons in Work Pending

The Koppers Building in Pittsburgh, requiring 8000 tons, a Mississippi River bridge at Cairo, Ill., calling for 5800 tons, and a power plant at Detroit, which will take 5250 tons, account for a large part of the 33,300 tons of structural steel work contracted for during the week. Work pending, which totals 24,300 tons, includes 6000 tons for a savings bank in Brooklyn, 2500 tons for a theater and office building in New York and 2000 for a temple in New York. Awards follow:

BINGHAMTON, N. Y., 225 tons, building for Binghamton Light & Power Co., to Belmont Iron Works.

WOODLAWN, PA., 100 tons, Woodlawn Realty Co. warehouse, to Jones & Laughlin Steel Corporation.

PITTSBURGH, 8000 tons, Koppers Building, to McClintic-Marshall Co.

POINT PLEASANT, W. VA., 1825 tons, highway bridge over Ohio River, to American Bridge Co.

DELRAY, MICH., 5250 tons, power house, Detroit Edison Co., to American Bridge Co.

CAIRO, ILL., 5800 tons, bridge for Cairo Bridge & Terminal Co., to American Bridge Co.

ST. PAUL, MINN., 115 tons, terminal building, to St. Paul Foundry Co.

ELKHART, IND., 175 tons, foundry building, to Edwards Iron Works, Evansville.

ST. LOUIS-SAN FRANCISCO RAILWAY, 260 tons, bridge, to an unknown bidder.

GALION, OHIO, 300 tons, factory for Galion Metallic Vault Co., to Massillon Bridge & Structural Co.

CLEVELAND, 225 tons, factory addition for Billings Chapin Co., to McClintic-Marshall Co.

CAMBRIDGE, MASS., 225 tons, aeronautical laboratory, Massachusetts Institute of Technology, to New England Structural Co.

BOSTON, 200 tons, bascule span, Dorchester Bay bridge, to American Bridge Co.

NEW HAVEN, CONN., 900 tons, laboratory for Yale University, to Lehigh Structural Steel Co.

NEW YORK, 1700 tons, International Magazine Building, to Levering & Garrigues Co.

NEW ROCHELLE, N. Y., 300 tons, office building, to an unnamed local fabricator.

PHILADELPHIA, 150 tons, garage, to McClintic-Marshall Co.

BALTIMORE & OHIO RAILROAD, 150 tons, bridges, to American Bridge Co.

BALTIMORE, 350 tons, hospital for Johns Hopkins University, to Dietrich Brothers.

NORFOLK, VA., 1800 tons, highway bridge over south branch of Elizabeth River, to Atlantic Structural Steel Co.

CHARLESTON, W. VA., 300 tons, addition to boiler house, Carbide & Carbon Chemical Corporation, to Pittsburgh Bridge & Iron Works.

STATE OF ALABAMA, 300 tons, highway bridge, to Nashville Bridge Co.

CHICAGO, 148 tons, building for Commonwealth Edison Co., to Gage Structural Steel Co., Chicago.

CHICAGO, 2000 tons, bascule bridge across the Chicago River, to American Bridge Co.

RACINE, WIS., 500 tons, theater, to Lakeside Bridge & Iron Co., Milwaukee.

WATERLOO, IOWA, 210 tons, building for John Deere & Co., to Rochester Bridge Co., Rochester, Ind.

OAKLAND, CAL., 370 tons, steam plant, First and Jefferson Streets, for Pacific Gas & Electric Co., to California Steel Co., San Francisco.

SAN FRANCISCO, 500 tons, apartment building, Green Street, near Taylor, to Dyer Brothers, San Francisco.

SAN FRANCISCO, 250 tons, apartment building, Jackson Street, near Buchanan, to Schrader Iron Works, San Francisco.

SAN FRANCISCO, 200 tons, apartment building, Van Ness Avenue and Clay Street, to Herrick Iron Works, Oakland.

SAN FRANCISCO, 137 tons, bridge over Trinity River in Trinity County, for the United States Bureau of Public Roads, to Pacific Rolling Mill Co., San Francisco.

HONOLULU, 200 tons, nine buildings for St. Louis College, to an unnamed local fabricator.

HONOLULU, 112 tons, warehouse for Hawaiian Pineapple Co., to California Steel Co., San Francisco.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

HARRISBURG, PA., 1000 tons, second section of Soldiers' and Sailors' Memorial Bridge.

ALLENTOWN, PA., 600 tons, bridge over Lehigh Valley tracks.

NEWARK, N. J., 2000 tons, State highway bridge.

TOMS RIVER, N. J., 220 tons, State highway bridge.

LUZERNE COUNTY, PA., 235 tons, two highway bridges.

RICHMOND, IND., 140 tons, bridge for Pennsylvania Railroad.

NEW YORK, 2500 tons, theater and office building, Broadway and Seventy-fifth Street.

NEW YORK, 2000 tons, Temple Emanuel, 521 Fifth Avenue.

BROOKLYN, 6000 tons, Williamsburg Savings Bank.

NEWARK, N. J., 125 tons, building for Lehigh Valley Railroad.

PHILADELPHIA, 300 tons, Pennsylvania Railroad bridge.

PHILADELPHIA, 500 tons, highway bridge, Department of Public Works.

BALTIMORE & OHIO RAILROAD, 350 tons, bridges.

RICHMOND, VA., 800 tons, apartment building.

PORTSMOUTH, OHIO, 900 tons, crane runway, Norfolk & Western Railway.

KENMORE, N. Y., 250 tons, Roosevelt School; low bidder on general contract, Charles Everitt, Buffalo.

QUINCY, ILL., 2300 tons, highway bridge across the Mississippi River.

CHICAGO, 750 tons, garage for Motor-Amp Corporation.

ABERDEEN, S. D., 400 tons, hotel.

TULSA, OKLA., 500 tons, American Exchange Bank Building.

ST. GABRIEL, CAL., 1000 tons, power house.

SAN PEDRO, CAL., 900 tons, public hall.

RIVERSIDE, CAL., 340 tons, pipe line, Baker Iron Works, Los Angeles, low bidder.

SAN FRANCISCO, 150 tons, plate work for Standard Oil Co. of California; bids being taken.

REINFORCING STEEL

Awards of 3600 Tons and New Projects of 3000 Tons, Mostly Small Work

Awards of concrete reinforcing steel during the week amounted to 3600 tons, while fresh projects totaling 3000 tons came up for bids. Most of the jobs are small. Awards follow:

NEW YORK, 390 tons, warehouse and loft building, Eleventh Avenue and Forty-eighth Street, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, factory extension, National Urn Bag Co., 140th Street and Southern Boulevard, to Jones & Laughlin Steel Corporation.

BROOKLYN, 300 tons, building for Ideal Chair Co., 1406 Metropolitan Avenue, to Igoe Brothers.

LONG ISLAND CITY, 100 tons, incinerator plant for City of New York, Kelly & Kelly, general contractors; foreign steel purchased.

NEWARK, N. J., 500 tons, building for Merchant Refrigerating Co., 41 River Street, to Igoe Brothers.

PASSAIC, N. J., 600 tons, sewer work, from Spiniello Construction Co., general contractor, to Joseph T. Ryerson & Son, Inc.

SPRINGFIELD, ILL., 150 tons of rail steel, State road work, to Calumet Steel Co.

CHICAGO, 160 tons, public school, to Olney J. Dean & Co.

INDIANAPOLIS, 350 tons, building for Butler University, to an unnamed bidder.

CHICAGO, 220 tons, Central police station, to Olney J. Dean & Co.

LOS ANGELES, 130 tons, Nurses' Home on Waterloo Road, to an unnamed local jobber.

SAN FRANCISCO, 260 tons, Southside School, to an unnamed local jobber.

SAN FRANCISCO, 159 tons, for Mare Island Navy Yard, to Pacific Coast Steel Co.

SAN FRANCISCO, 100 tons, apartment building, Green Street, near Taylor, to Badt-Falk & Co.

SAN FRANCISCO, 100 tons, garage, 1765 California Street, to Cahill Brothers.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars included the following:

LONG ISLAND CITY, N. Y., approximately 1000 tons, Bloomingdale warehouse; general contract not let.

FORT HUMPHREY, VA., 450 tons, United States Army barracks.

PHILADELPHIA, 200 tons, work at Sixth and Duncannon Streets for U. G. I. Construction Co.

PROVIDENCE, R. I., 200 tons, White Motor Co., warehouse.

STAFFORD SPRINGS, CONN., 100 tons, savings bank.

BUFFALO, 135 tons, school No. 29; being refigured.

BARABOO, WIS, 125 tons, Broadway State highway bridge; bids closed July 6.

NORMAL, ILL., 400 tons, high school; A. L. Pillsbury, Bloomington, Ill., architect.

CHICAGO, 285 tons, Twelfth Street viaduct.

CHICAGO, 600 tons, Dorchester Apartments; E. P. Stranberg Brothers, contractors.

CHICAGO, 210 ton, apartment building at Seventy-sixth Street and Exchange Avenue; T. R. Bishop, architect.

CHICAGO, 300 tons, Catholic high school.

COVINGTON, KY., 1300 tons, terminal development by the Chesapeake & Ohio Railroad.

The board of directors of the Colonial Steel Co., Pittsburgh, has called for redemption on June 1 all the outstanding preferred stock of the company at $110 per share. This will leave only one class of stock outstanding, there being no bonded indebtedness.

RAILROAD EQUIPMENT

Chicago & North Western Buys 1000 Cars and North American Car Co. Orders 500

Freight cars ordered during the week totaled 1820, of which the Chicago & North Western bought 1000, the North American Car Co. 500 and the Great Northern 250. Two roads are inquiring for a total of 30 locomotives and the Pennsylvania Railroad will build 25 in its own shops.

In the first five months of the year the railroads placed 30,251 new freight cars in service, a decrease of 12,049 cars as compared with the same period last year. Freight cars in need of repair on June 15 totaled 144,885, or 6.4 per cent of the number on line, a decrease of 2564 cars from the number reported as of June 1. On June 1 Class 1 railroads had 9557 locomotives in need of repair, an increase of 527 compared with the June 1 situation.

Details of the week's railroad equipment business follow:

The North American Car Co. has placed 500 refrigerator cars with the Pressed Steel Car Co.

The Chicago & North Western has awarded 500 box cars to the General American Tank Car Corporation and a like number to the Standard Steel Car Co.

The Great Northern has awarded 250 70-ton gondola cars to the Pressed Steel Car Co.

The Wichita Falls & Northwestern has placed 10 box cars with the American Car & Foundry Co.

The Clinton & Oklahoma Western has ordered 10 box cars from the American Car & Foundry Co.

The Central Cuba Sugar Co., has contracted for 50 cane cars with the American Car & Foundry Co.

The Chesapeake & Ohio is inquiring for 3 mail and express cars.

The Boston Elevated Railroad has placed 4 air-dump cars with the Differential Steel Car Co.

The Pennsylvania Railroad will build 25 K-4-s type locomotives at its Altoona shops.

The South African Railways are inquiring for 50 bogie fruit wagons.

The Anglo-Mexican Petroleum Co. is in the market for 15 high-side 40-ton gondola cars and 15 box cars.

The New York Central has ordered 11 locomotive tenders from the American Locomotive Co.

The American Railroad of Porto Rico has placed one consolidation type locomotive with the Baldwin Locomotive Works.

The New York Central has ordered 10 special flat cars from the Standard Steel Car Co. and 4 business cars from the Pullman Car & Mfg. Corporation.

The Atchison, Topeka & Santa Fe has ordered one 73-ft. combination passenger and baggage gas-electric rail motor car from the J. G. Brill Co.

The Boston & Maine is in the market for 25 locomotives.

The Missouri Pacific is inquiring for 5 locomotives.

Industrial Finances

The A. M. Byers Co., Pittsburgh, for the six months ended March 31, 1927, had net sales of $5,628,768, leaving a gross manufacturing profit of $1,550,798 and a net profit of $673,472. In the year ended Sept. 30, 1926, the company earned $1,465,673. Listing of 40,000 additional shares of common stock has just been authorized, increasing the total common shares outstanding to 200,000.

The American Car & Foundry Co., New York, has issued its pamphlet report for the year ended April 30, 1927, showing net income of $4,593,377 after all charges and Federal taxes, equivalent after preferred dividends to $4.15 a share on the 600,000 shares of no par common stock outstanding. This compares with $6,102,897 or $6.67 a share in the previous year. After paying common dividends this year there was a deficit of $1,106,623 compared with a surplus of $402,897 in the preceding period.

The Dominion Steel Corporation, Montreal, reports operating profit of $3,833,274 for the year ended Dec. 31, 1926, compared with a loss of $723,524 in 1925. Net profit last year after depreciation, interest, etc., amounted to $1,508,463, while the net loss in the preceding year was $3,013,485. Consolidated profit and loss account indicates that the Dominion Iron & Steel Co., now in the hands of a receiver, had operating profit of $581,337 in 1926, as against $308,302 in 1925, but a loss of more than $600,000 after meeting interest charges.

The National Steel Fabric Co., Pittsburgh, a subsidiary of the Pittsburgh Steel Co., has taken out a new charter changing its capital stock from $100,000 common stock and $200,000 preferred stock to $500,000, all common stock.

PERSONAL

W. F. Graver has been elected president of the Graver Corporation, East Chicago, Ind., to succeed his brother, J. P. Graver, who remains with the company as vice-president. The new president has spent his entire business life with the company, having been vice-president and treasurer for a number of years. He will continue as treasurer. P. S. Graver continues as vice-president in charge of manufacturing operations and H. S. Graver retains the position of secretary. K. W. Bartlett, for several years general manager of the company, has been elected vice-president. He has been associated with the organization since 1910. A. E. Lucius, the newly appointed assistant secretary, has been legal representative of the company for a number of years.

W. F. GRAVER

—

S. A. Dinsmore has been appointed Chicago district sales representative of the Cuyahoga Steel & Wire Co., Cleveland, and will have offices at 327 South LaSalle Street. Recently he has been associated in a sales capacity with the Chicago office of the Standard Gauge Steel Co. and the Union Drawn Steel Co., both of Beaver Falls, Pa.

—

Breo LaPierre has been appointed district sales manager at Syracuse, N. Y., for the Lukens Steel Co., Coatesville, Pa. His offices will be at 307 Hefferman Building, and his territory will include that part of New York State north and west of Albany. For the last five years Mr. LaPierre has represented the Central Iron & Steel Co., Harrisburg, Pa., in the same territory and for the previous 12 years was with the Lackawanna Steel Co. at Syracuse.

—

C. E. Swab, formerly chief engineer Valley Mould & Iron Corporation, Sharpsville, Pa., has been appointed vice-president in charge of the western district with headquarters at Chicago, and L. J. Wilson has been appointed chief engineer with headquarters at Sharpsville.

—

George L. Rogers, file works manager Henry Disston & Sons, Inc., Philadelphia, on June 28 completed his fiftieth year with the Disston company. He operated the first saw file cutting machine put into operation by the Disston organization in 1877. Mr. Rogers was given a gold watch by the company as a token of appreciation for his faithful service.

—

Edwin T. Jackman has been appointed district manager at Chicago for the Firth-Sterling Steel Co., McKeesport, Pa., to succeed his uncle, the late Edwin S. Jackman.

—

John W. Meeker has resigned as general manager of the Cyclone Fence Co., to become president of the Bates Valve Bag Corporation, succeeding John W. Cornell.

—

V. M. Wall has been appointed Northern sales manager for the National Cast Iron Pipe Co., with offices at 122 South Michigan Avenue, Chicago. He succeeds A. E. Nelson, who has retired from active business on account of poor health.

W. C. Schade has been placed in charge of the Pittsburgh office of the C. O. Bartlett & Snow Co. at 406 Bessemer Building.

—

Aubrey J. Grindle, recently director and vice-president Grindle Fuel Equipment Co., Harvey, Ill., subsidiary of the Whiting Corporation, has severed his connection with that company to organize the Pulverized Fuel Equipment Co., 1238 Builders' Building, Chicago. Mr. Grindle first became identified with this type of equipment at the Deering plant, International Harvester Co., where he was for several years supervisor of experimental work on pulverized coal-firing equipment for malleable iron annealing ovens and melting furnaces. In 1915 he became associated with the Powdered Coal Engineering & Equipment Co., designing all of its original equipment. The following year he organized the Combustion Economy Corporation for the purpose of producing pulverized coal equipment for billet-heating furnaces, but work was temporarily halted when Mr. Grindle was called to Beloit, Wis., to take charge of the foundries of the Stewart-Warner Co., then engaged in making ordnance materials. The following year he was made chief army inspector of ordnance in charge of inspection of materials in a number of factories in the Chicago district. Returning to his own company after the war, Mr. Grindle made a number of successful installations in malleable iron plants. In 1920 the company was taken over by the Whiting Corporation.

AUBREY J. GRINDLE

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Paul A. Ivy, vice-president and general sales manager of the American Cast Iron Pipe Co., Birmingham, has resigned. He was also a director of the company.

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W. F. Hart has been appointed sales agent in charge of pipe and tubes by the Bethlehem Steel Co., and Duncan Morris has also been appointed to a sales position in the same department. Both Mr. Hart and Mr. Morris will be located at Bethlehem.

The How and Why of Crystal Growth

Sir Henry A. Miers, F.R.S., delivered the seventeenth annual May lecture before the Institute of Metals, at Storey's Gate, Westminster, London, England, on May 11. His subject was "Growth of Crystals."

He recalls in the address experiments made 20 years ago by himself and Miss Isaac which seemed at that time to show that, when a solution is cooled below its saturation temperature, it passes into a "metastable" state in which crystals can only be produced by introducing a fragment of the dissolved substance or of one isomorphous with it, and that at a lower temperature it passes into a "labile" state in which crystals may appear spontaneously. Later investigations have shown that crystallization can also be produced by shock.

The author, however, considers that his experiments record the normal behavior of crystallizing liquids and that crystallization only takes place with some degree of supersaturation or undercooling. In his experiments there was always a sudden outburst of crystal growth at a definite temperature.

Little importance is ascribed to undercooling by most geologists in their speculations concerning the crystallization of molten magmas, but to many metallurgists it is a very important factor. The structure of alloys is in many cases attributed to a suspended crystallization of this nature; not only as they sodidify from the molten state, but also during the crystalline changes which take place in the solid alloy with change of temperature, as in steel, and in magnetic alloys.

OBITUARY

EDWARD L. FORD, director and member of the executive committee of the Youngstown Sheet & Tube Co., died July 4, age 71 years, following an operation three weeks ago. He was one of the closest advisers of President James A. Campbell in the management of the Sheet & Tube company. Mr. Ford was one of the founders of the old Brier Hill Steel Co. He invented, after years of experimentation, a process of producing puddled iron mechanically and formed the Youngstown Steel Co. to develop this process. This company erected a $2,000,000 plant at Warren, Ohio, which is now under lease to the A. M. Byers Co., Pittsburgh. Mr. Ford specialized in metallurgical processes, as related to iron and steel. He was a son-in-law of Joseph G. Butler, Jr., of Youngstown.

EDWARD L. FORD

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HENRY T. SCOTT, chairman Pacific Telephone & Telegraph Co., and one time president of the Union Iron Works, San Francisco, died at his home in Hillsborough, Cal., June 27. He was born near Baltimore, Sept. 20, 1846. In 1867 he went to San Francisco, where he obtained employment with the Union Iron Works as a shipping clerk. When the company was reorganized in 1875 as the Prescott-Scott Co., he had become a member of the firm. In 1882 it was reorganized again as the Union Iron Works and Mr. Scott became vice-president. Two years later he was made president and remained in that position until 1903 when the firm was sold to the Bethlehem Steel Co. In 1906 he became president of the Pacific Telephone & Telegraph Co., San Francisco, and served in that capacity until a few years ago when he retired to become chairman of the board.

—

JESSE A. CURREY, for 20 years manager at Portland, Ore., for the Truscon Steel Co., Youngstown, Ohio, died June 23 at his home in that city, aged 54 years.

—

J. K. WILLIAMS, founder of the Williams Foundry & Machine Co., Akron, Ohio, died on June 15.

—

WILLIAM G. COXE, president Pusey & Jones Corporation, Wilmington, Del., shipbuilder and manufacturer of paper mill machinery, died July 4 at his home following a brief illness. He was 57 years of age and had been engaged in shipbuilding work both here and abroad during the entire time since his graduation from college in 1891.

—

R. D. BLACK, who for a number of years had represented the Central Iron & Steel Co., Harrisburg, Pa., in the sale of steel plates in the Baltimore district, died on July 4 upon his return from a trip in the South, where he had been taken ill. He was about 40 years of age.

The use of artificial wheels for the grinding of roll-turning tools is discussed by R. H. Cannon, in the May issue of *Grits and Grinds*, published by the Norton Co., Worcester, Mass. A special machine for this class of grinding is pictured.

Business Failures in the Steel and Allied Industries

From a diagram published by the Bureau of the Census, it appears that the number of business failures in the iron, steel and machinery industry, in the lumber and lumber products industry and in the manufacture of cloths and clothing were all about the same in the spring of 1920, at approximately 16 per month in each case. Since that time and until the end of 1925, the lumber industry showed much the greater business health, with the steel group intermediate between lumber and textiles, running about 55 in 1922, its maximum point. From the beginning of 1926, however, the steel group has been showing fewer and fewer business failures, until in May of this year the figure had dropped to 32, whereas it was around 60 for both the other groups.

Prior to the spring of 1920, and stretching back as far as the diagram shows, the beginning of 1914, the iron and steel and machinery group was below all the others in numbers of business failures. The maximum reached during the period was about 38 per month, in the summer of 1915, from which point there was a fairly uniform drop to the low level reached in 1920.

Unfortunately, the diagram does not show anything about the proportion of the firms in business which have failed, month by month. The mere number tells only a part of the story.

Blast Furnace Gas Studies

Technical Paper 401 of the United States Bureau of Mines gives results of studies by J. F. Barkley on blast furnace gas. Copies of the pamphlet may be obtained at 5c. from the Superintendent of Documents, Government Printing Office, Washington. The study was made at the Edgar Thomson Works. One main object was to discover the relation between amount of gas produced and pounds of coke used per ton of iron. Another object was to determine variations day by day between the amount of gas produced and the amount found by calculation from the furnace charges. In the latter case there was found a divergence of as much as 15 per cent between calculated and measured gas volumes.

With regard to the production of gas measured on the dry basis at 62 deg. Fahr., 30 in. of mercury and 90 B.t.u. per cu. ft., the curve shows an increasing volume with increasing fuel consumption. At 1800 lb. of coke per ton, the gas volume per ton of iron was 120,000 cu. ft. This increased to 160,000 cu. ft at 2200 lb. of coke.

Booklet on Exporting Issued by Chamber of Commerce

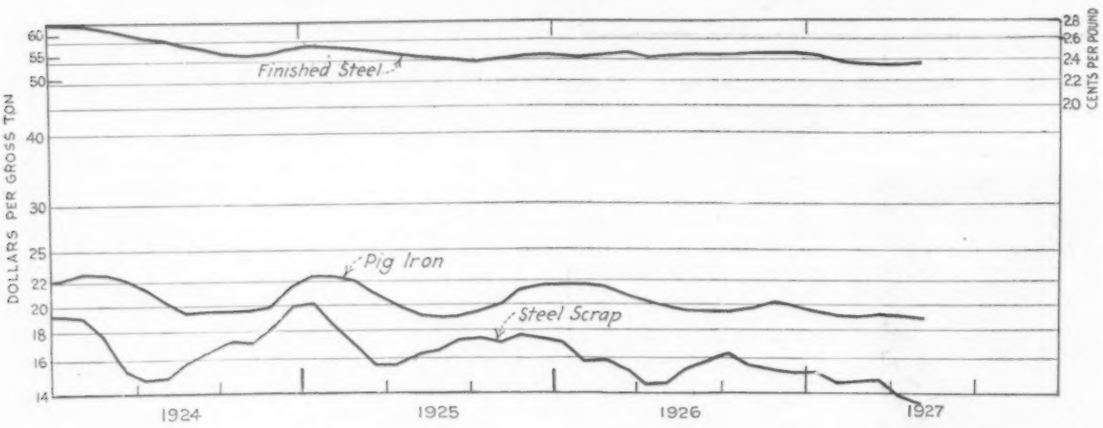
"Doing Export Business," a pamphlet of 64 pages, has been published by the foreign commerce department of the Chamber of Commerce of the United States, Washington. The purpose of the publication is to supply in part, answers to many of the questions received by the chamber from manufacturers and merchants interested in developing export trade but unfamiliar with the field.

The booklet includes sections explaining how to select the most desirable foreign markets for the product under consideration, how to establish an export department, the promotion of foreign sales by advertising, circularizing and by catalogues, how to fill export orders and details which should be included in making agency agreements with foreign distributers. There is also a brief outline of cable and radio codes, export abbreviations and a short bibliography relating to various phases of export trade.

Operations in Mahoning Valley

YOUNGSTOWN, July 5.—Three sheet mill plants are idle this week, Falcon Steel Co., Mahoning Valley Steel Co. and the Deforest works of the Republic Iron & Steel Co. The steel industry is averaging 55 to 60 per cent in the Mahoning Valley.

Scrap Prices Have Been Moving Downward for 3½ Years, With Occasional Partial Recovery. They now have touched the lowest level since 1922. Pig iron and finished steel have fallen to lower levels than in some years



SCRAP PRICES STILL LOWER

Pig Iron and Finished Steel Also Lower Than for Some Years

AVERAGE prices of heavy melting steel scrap at Chicago, Pittsburgh and Philadelphia reached a lower level in June than at any time since the first quarter of 1922. As shown in the table, the June average, $13.60, was nearly 3 per cent below the $13.95 of May. The present decline began in September, which was the highest month since the previous January.

While pig iron stiffened a little in March and April, it since has become lower than it has been for some years. June showed the low level of $18.92 a gross ton, compared with $19.09 in May and with $20.01 in June of last year. The peaks and hollows of its curve do not by any means coincide with those of scrap.

Finished steel, which had maintained a fairly uniform price all through 1926, has shown a declining tendency since then, with May at the lowest level in about five years, and a slight recovery later. In June it was 2.369c. a lb. compared with 2.360c. a lb. in May and 2.420c. a lb. in June, 1926. As has often been noted, the fluctuations in the finished product are much less violent than those in the partly finished (pig iron) and in the raw material, such as steel scrap.

Both by diagram and in the table, the three composite prices are shown. The table covers 30 months, while the diagram traces the history of these movements from the beginning of 1924.

Composite Prices on Iron and Steel Products
(Per Gross Ton)

	Steel Scrap	Pig Iron	Finished Steel, Per Lb.
January, 1925	$20.10	$22.44	2.560c.
February	18.27	22.50	2.546c.
March	16.92	21.99	2.537c.
April	15.48	20.95	2.503c.
May	15.46	19.85	2.460c.
June	16.09	19.22	2.440c.
July	16.46	18.96	2.435c.
August	17.23	19.01	2.413c.
September	17.42	19.38	2.397c.
October	17.08	19.92	2.405c.
November	17.63	21.17	2.433c.
December	17.37	21.54	2.450c.
Year's average	*17.12*	*20.58*	*2.465c.*
January, 1926	16.97	21.79	2.447c.
February	15.50	21.77	2.428c.
March	15.83	21.65	2.433c.
April	15.27	20.96	2.439c.
May	14.35	20.69	2.416c.
June	14.40	20.00	2.420c.
July	15.42	19.51	2.431c.
August	15.88	19.46	2.431c.
September	16.25	19.46	2.439c.
October	15.58	19.69	2.449c.
November	15.25	20.13	2.453c.
December	15.08	19.94	2.453c.
Year's average	*15.48*	*20.42*	*2.439c.*
January, 1927	15.17	19.44	2.432c.
February	14.58	19.07	2.378c.
March	14.65	19.03	2.367c.
April	14.71	19.21	2.360c.
May	13.95	19.09	2.360c.
June	13.60	18.92	2.369c.
6-month average	*14.44*	*19.13*	*2.378c.*

Chicago Iron and Steel Market

Concluded from page 41

large contract. Lettings and fresh inquiries are shown on page 53.

Wire Products.—Demand is in fairly steady volume from the manufacturing trade, specifications for the week being only slightly below the average for the past month. Third quarter contracting has not been of large proportions, it being evident that buyers are still uncertain as to the extent of their requirements over the next two or three months. Producers have adopted the policy of accepting quarterly contracts from jobbers, which has long been the practice in selling the manufacturing trade. Jobbers on the whole report that business is lighter, and this is being reflected in orders to mills. Sales in the Northwest are holding up unusually well for this time of the year. The Middle Western States are yielding a fair amount of business, but orders from the South are few in number and small in size. The nail market throughout this territory is very quiet, and no real test of prices has developed. Mill operations average 55 to 60 per cent of capacity. Mill prices on wire and wire products are given on page 37.

Bolts, Nuts and Rivets.—Buyers have shown little hesitancy in accepting third quarter contracts, which were offered with limits closer to actual requirements than has heretofore been the case. Prices are holding well, and specifications at the beginning of the new month are close to the weekly average in June.

Coke.—Shipments of by-product foundry coke in June were in practically the same volume as in May. Since almost all users had covered for the year, there was little interest in second half buying. Prices are steady at $9.75, local ovens, and $10.25, delivered in the Chicago switching district.

Armco Developments

The program of improvements now being carried out by the American Rolling Mill Co. will cost $10,000,000 and should be completed within 15 to 18 months, according to George M. Verity, president. Mr. Verity states that the company's works at Ashland, Ky., are being rounded out by the addition of two open-hearth furnaces, another continuous sheet mill, new shops, and minor improvements.

Extensive betterments also are planned for the East Side works at Middletown, Ohio. These include changes and additions necessary to adapt the steel plant to hot metal practice and to provide finishing capacity to take care of the additional tonnage that will be provided in the open-hearth department through the use of hot metal. The arrangement with the Hamilton Coke & Iron Co., from which the hot metal will become available, should be working within 12 to 15 months. No new financing is contemplated.

Where American Steel Went in May

Exports Highest for Any Month Except Two Since January, 1924—Five-Month Total Ahead of Last Year

AS usual, Canada was by far the leading destination of American steel exports in May, taking 85,862 tons. For the five months ended with May of the present year exports to Canada totaled 356,337 tons, compared with 329,333 tons for the corresponding period of 1926. Japan ranked second as the destination of exports in May, 1927, taking 38,463 tons. For the five months ended with May of the present year exports to Japan amounted to 131,152 tons, against 118,241 tons for the corresponding period of last year.

For five months, the gain in total exports was about 9 per cent over last year. The increase to Canada was likewise nearly 9 per cent; to Japan, 11 per cent; to South America, 11 per cent.

United States Exports of Iron and Steel

(In Gross Tons)

	All Iron and Steel	Pig Iron	Semi-Finished Material
*Average, 1912 to 1914...	2,406,218	221,582	145,720
*Average, 1915 to 1918...	5,295,333	438,462	1,468,020
*Average, 1919 to 1921...	3,804,910	185,315	162,048
*Average, 1922 to 1924...	1,927,988	34,906	124,789
Calendar year 1925.....	1,762,571	32,674	108,681
January, 1926.....	174,585	1,663	4,388
February	157,187	1,478	5,615
March	169,438	1,489	6,050
April	194,449	2,010	7,167
May	173,418	1,107	9,880
June	159,506	1,369	5,714
Fiscal year 1926.....	1,948,860	30,587	103,271
July	194,717	2,595	14,558
August	171,588	2,744	14,437
September	182,071	2,173	12,569
October	172,070	2,205	13,983
November	219,830	3,724	17,528
December	198,189	2,651	10,412
Calendar year 1926.....	2,167,048	25,208	120,602
January, 1927	215,235	3,734	5,531
February	166,129	2,466	3,935
March	171,094	3,647	7,782
April	192,339	3,753	8,748
May	202,708	4,115	8,230
Eleven months	2,093,804	33,768	115,911

*Calendar years.

Destination of Iron and Steel Products Exported from the United States

(In Gross Tons)

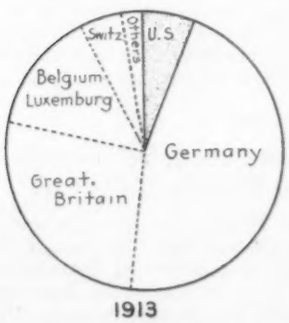
Country of Destination	May, 1927	January Through May 1927	January Through May 1926
*North and Central America and the West Indies.....	*109,860*	*461,799*	*446,846*
Canada and Newfoundland...	85,972	356,736	329,600
Cuba	7,132	34,889	38,610
Mexico	10,669	37,533	41,016
Guatemala	501	3,710	6,671
Salvador	718	2,489	9,725
Panama	1,468	7,567	3,566
British West Indies.....	1,273	6,726	3,914
Other West Indies.....	1,320	6,240	7,566
Other Central America.....	807	5,909	6,178
*South America.....	*21,921*	*159,870*	*144,289*
Argentina	4,792	35,171	26,398
Brazil	4,408	35,919	16,526
Chile	2,587	11,774	24,604
Colombia	2,641	28,204	26,715
Peru	4,120	13,878	16,865
Venezuela	2,196	27,767	27,832
Other South America.....	1,177	7,157	5,349
*Europe	*8,293*	*63,975*	*59,323*
France	574	1,753	6,691
Italy	977	14,013	18,808
Rumania	122	1,132	1,723
Russia	53	2,118	2,806
Turkey	121	930	672
United Kingdom.....	4,206	29,861	21,183
Other Europe	2,240	14,168	7,440
*Far East	*59,880*	*252,527*	*212,481*
Australia	2,886	14,111	9,132
British Malaya	397	5,214	4,718
China	4,867	29,923	15,751
Dutch East Indies.....	2,619	18,610	14,970
India	786	13,816	15,240
Japan and Chosen.....	38,463	131,152	118,241
Kwangtung	5,055	11,965	3,698
Philippine Islands.....	3,838	20,277	27,198
Other Asia and Far East.....	969	7,459	3,533
*Africa	*2,754*	*9,333*	*6,160*
British South Africa.....	1,669	4,196	3,089
Egypt	497	2,178	2,190
Portuguese East Africa.....	567	2,421	708
Other Africa.....	21	538	173
Total	202,708	947,504	869,099

French Imports of Industrial Machinery

PRODUCTION of industrial machinery in France, according to estimates prepared by the industrial machinery division, Bureau of Foreign and Domestic Commerce, Washington, amounted in 1913 to approximately $45,000,000. In 1925 the gold value of the corresponding production is given as $116,865,000, or 160 per cent more. Machine tool production in 1913 amounted to a little less than $2,000,000. The estimated gold value of the 1925 machine tool output, however, was approximately $7,000,000.

Exports of industrial machinery from France reached a new record in 1926, amounting to 100,191 metric tons. Imports on the other hand fell off from 76,734 tons to 72,440 tons. In 1913 the imports were 126,294 tons and exports 27,243 tons.

American industrial machinery commands the highest price per ton of any of the French imports, except that coming from Switzerland. In 1926, the approximate values were $540 per ton for Switzerland, $485 for the United States, $435 for Great Britain, $390 for Germany, and $190 for Belgium.



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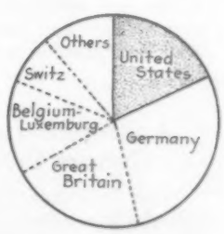

1926

Proportions of French Industrial Machinery Imports Furnished by Principal Suppliers. The 1926 total was considerably less than in 1913

(In Metric Tons)

Country of Origin	1913	1923	1924	1925	1926
United States.....	7,425	9,148	10,625	14,543	13,308
Great Britain.....	33,014	24,595	19,572	22,651	14,834
Germany	58,439	17,469	15,079	16,957	20,459
Belgium-Luxemburg .	18,043	16,017	13,670	11,629	10,287
Switzerland	6,820	9,174	7,459	7,027	5,435
Others	2,554	6,691	6,930	3,927	8,117
Totals 126,295		83,094	73,335	76,734	72,440

May Imports of Steel and Iron Higher

But Total for 5 Months Drops 36 Per Cent Below Last Year—Principal Gain in May Was Pig Iron and Pipe

BELGIUM led as the source of imports of iron and steel into the United States in May, providing 19,575 tons; Germany was second, with 17,243 tons, and British India third, with 10,402 tons, all of which was pig iron. Other sources of the 17,164 tons of pig iron imported in May were the United Kingdom, 3600 tons; the Netherlands, 2315 tons, and Germany, 680 tons.

The month's total, 79,814 tons, was the highest since last November. But for 11 months the total is the lowest since the middle of 1925. For five months, imports were 314,915 tons, against 488,759 tons last year.

Imports of Iron and Steel in Gross Tons

	Total Imports	Pig Iron	Ferro-alloys	Manganese Ore and Oxide*
Calendar year 1922..	714,224	383,445	109,084	374,451
Calendar year 1923..	734,599	367,820	100,120	206,048
Calendar year 1924..	556,814	209,109	59,910	255,157
Calendar year 1925..	943,240	441,425	80,269	265,688
January, 1926	79,067	48,423	3,105	37,421
February	100,273	59,122	5,194	27,239
March	93,107	54,825	4,606	27,391
April	107,636	54,359	6,949	59,666
May	108,731	57,211	3,002	21,633
June	124,215	43,106	5,277	31,315
Fiscal year 1926.....	1,080,781	528,305	64,106	388,407
July	89,411	32,206	1,702	34,133
August	91,578	26,538	4,611	41,075
September	85,484	17,508	2,525	18,167
October	81,830	18,847	4,879	13,331
November	81,259	17,560	6,057	20,091
December	75,559	14,783	8,752	26,971
Calendar year 1926..	1,111,090	445,602	56,809	354,223
January, 1927	63,452	9,326	2,517	50,605
February	49,460	4,417	2,968	21,585
March	61,872	7,492	4,611	22,917
April	60,374	8,923	3,343	29,704
May	79,814	17,164	3,135	18,223
Eleven months.....	809,000	174,764	45,288	296,752

*Not included in "total imports." These figures are for manganese contents of the ore.

Imports of Iron and Steel Products Into the United States by Countries of Origin

(In Gross Tons)

	May, 1927	April, 1927	May, 1926
Austria	78	146	23
Belgium	19,575	17,775	18,055
Czechoslovakia	548	10	6
Estonia	2	52	.....
France	9,115	13,248	20,640
Germany	17,243	7,804	28,678
Italy	20	.....	125
Netherlands	2,747	4,024	6,207
Norway	1,177	.....	877
Poland and Danzig	100	213	.....
Sweden	2,179	2,381	1,724
United Kingdom	7,341	6,154	15,320
Other Europe	27	18	5
Europe	*60,152*	*51,824*	*91,660*
Canada	9,202	6,224	5,061
Honduras	4	.....	.....
Mexico	45	54	.....
Cuba	1	.....	2
Dominican Republic	6	.....	.....
French West Indies	.....	120	.....
British India	10,402	2,149	12,005
Hongkong	1	2	.....
Japan	1	1	.....
Other Asia	.....	.....	3
Total	79,814	60,374	108,731

Sources of American Imports of Iron Ore

(In Gross Tons)

	May		Eleven Months Ended May	
	1927	1926	1927	1926
Canada	2,365	10,225	16,346	16,462
Cuba	48,000	59,200	501,500	473,562
Chile	101,500	102,600	1,212,400	1,177,400
Spain	.....	.....	17,312	90,862
Sweden	9,294	7,051	112,036	112,795
French Africa	25,025	30,966	327,329	142,552
Other countries	24	28,636	238,195	94,179
Total	186,208	238,678	2,425,118	2,107,812

Chambersburg Engineering and National Machinery Combine Sales Forces

In line with the efforts that many manufacturers are taking to increase the effectiveness of their sales efforts and at the same time to reduce costs of distribution, the Chambersburg Engineering Co., Chambersburg, Pa., and the National Machinery Co., Tiffin, Ohio, have combined sales organizations. Sales offices, aside from those at the plants, will be maintained in New York, Chicago and Detroit. The lines made by the two companies do not conflict, but augment each other except for a slight overlapping on forging equipment. The Chambersburg Engineering Co. makes forging and pressing machinery, including steam hammers, hydraulic presses and riveters and related lines, while the National Machinery Co. makes forging machines and bolt and nut making machinery. Outside of the combined selling organizations the two companies will remain distinct, there being no changes in ownership, management or personnel. The point is stressed that customers dealing with the new sales organization will have the benefit of the combined experience and engineering data available.

Colorado Fuel & Iron Co. Organizes Distributing Company

The Colorado Fuel & Iron Co., Denver, has organized the Colorado Fuel & Iron Products Co. to act as a distributer of its products. The company heretofore has not operated warehouses for the benefit of jobbers in its trade territory, but has confined itself largely to mill shipments. Location of warehouses has not yet been decided upon, but it is expected that one or more will be situated on the Pacific Coast. The incorporation of the marketing company follows in part the plan of the United States Steel Products Co.

Michigan Section of Electrochemists Formed

Members of the American Electrochemical Society met recently at the Detroit Engineering Societies' Club and inaugurated a new section of the society. After Secretary Fink had outlined the advantages of local sections and recited the experience of other sections, W. M. Phillips, who, together with R. M. Burns, was largely responsible for the formation of the section, was elected temporary chairman. A nominating committee was appointed to report back at the June meeting. About 50 engineers and chemists were in attendance. The name of the section was unanimously voted to be the Michigan Section, since it was planned to hold meetings at Detroit, Lansing and other towns in Michigan.

The nickel plating industry of Michigan is the largest in the world. Furthermore, the low temperature electric furnace installations are more numerous than in any other State and have set new standards of design and operation. The interest in electrochemistry is very keen and there is every indication that the new Michigan Section will be one of the livest of the society.

Anaconda Interests Acquire Detroit Copper & Brass Rolling Mills Co.

The Anaconda Copper Mining Co., through a subsidiary, has acquired the assets and business of the Detroit Copper & Brass Rolling Mills Co., Detroit, and the plant will hereafter be operated by the American Brass Co., New York, as its Detroit branch. The Detroit company has a capacity of 100,000,000 lb. of finished products annually and is operating at 75,000,000 lb. Stockholders of the Detroit company have approved the sale.

Machinery Exports Continue High

May Below April but Above Last Year—More Industrial Machinery in April and May Than Since 1921

WASHINGTON, July 1.—Exports of machinery of all kinds were valued at $35,969,289 in May, against $39,793,078 in April. For the five months ended with May the total was $176,686,910, compared with $188,898,995 for the corresponding period of last year. Exports of power-driven metal-working machinery in May represented 611 in number, valued at $776,882, as against 734, valued at $1,065,501, in April.

Imports in May of machinery, as listed in THE IRON AGE table, were valued at $2,663,943, compared with $1,840,163 in April. For the five months ended with May, 1927, the value was $9,798,630, as against $8,550,657 for the corresponding period of last year. Industrial machinery imports in May, as listed by the Division of Statistics, Department of Commerce, were valued at $2,315,363, compared with $1,192,986 in May, 1926, and were $7,688,333 for the five months ended with May, against $6,681,974 for the corresponding period of 1926.

Total exports of power-driven metal-working machinery in May were valued at $1,494,808, against $1,004,298 in May of last year. For the five months ended with May the value was $7,234,710, compared with $5,955,989 for the corresponding period one year ago. As classified by the Division of Statistics, exports of industrial machinery in May were valued at $16,508,966, against $18,996,495 in April, and $14,096,294 in May, 1926. For the five months ended with May given by this division was $84,551,435, against $74,800,505 for the corresponding period of 1926.

The Industrial Machinery Division list shows the value of this class of exports in May at $15,103,000, against $17,338,727 in April. For May, 1926, the value was $12,249,000. This division points out that the exports of industrial machinery in April and May of the present year have exceeded those of any month since 1921. Shipments of industrial machinery from the United States, as shown by this division, were valued at $73,537,000 during the five months ended with May, against $65,140,000 for the corresponding period of last year.

Both oil-well and metal-working machinery have shown marked gains during the current year, when compared with last year.

Machinery Exports from the United States

(In Thousands of Dollars)

	May		Five Months Ended May	
	1927	1926	1927	1926
Locomotives	$56	$305	$3,598	$2,382
Other steam engines	193	64	711	421
Boilers	159	137	828	746
Accessories and parts	61	116	210	314
Automobile engines	1,333	1,432	6,063	7,189
Other internal combustion engines	648	584	2,968	3,276
Accessories and parts	256	458	1,670	1,878
Electric locomotives	25	95	463	1,441
Other electric machinery and apparatus	736	533	2,921	3,602
Excavating machinery	337	307	1,884	2,210
Concrete mixers	124	70	532	320
Road-making machinery	306	198	927	826
Elevators and elevator machinery	410	462	2,036	2,214
Mining and quarrying machinery	1,105	1,086	6,263	6,916
Oil-well machinery	1,245	880	8,798	6,212
Pumps	599	553	2,730	2,702
Bending and power presses	134	14	516	361
Forging machines	84	60	362	474
Power-driven metal-working machines (a)	804	522	4,248	3,131
Other metal-working machinery and parts	398	315	1,909	1,924
Textile machinery	805	987	4,318	5,068
Sewing machines	678	694	3,937	3,649
Shoe machinery	144	140	614	548
Flour-mill and gristmill machinery	61	80	195	412
Sugar-mill machinery	202	221	1,112	1,200
Paper and pulp mill machinery	308	208	1,996	1,137
Sawmill machinery	57	85	311	457
Other woodworking machinery	151	121	566	557
Refrigerating and ice making machinery	926	462	3,239	1,824
Air compressors	547	553	2,464	2,199
Typewriters	1,801	1,609	8,979	8,221
Power laundry machinery	84	100	659	666
Typesetting machines	275	298	1,631	1,597
Printing presses	424	437	2,480	3,007
Agricultural machinery and implements	7,481	8,284	34,391	41,926
All other machinery and parts	13,010	10,151	60,160	67,890
Total	$35,969	$32,624	$176,687	$188,899

(a) Details in another table.

United States Exports and Imports of Machinery

	Exports of Machinery	Imports of Machinery	Exports of Power-Driven Metal-Working Machinery
The year 1924	$317,040,424	$9,711,618	$8,644,444
The year 1925	385,376,676	11,577,911	13,052,916
1926			
January	34,590,693	1,685,580	1,206,125
February	32,269,707	1,476,598	1,294,934
March	35,241,960	1,714,234	1,297,616
April	38,755,467	1,814,021	1,479,337
May	32,707,863	1,494,156	1,004,298
June	30,498,054	1,484,127	1,024,252
Fiscal year	398,306,436	15,413,144	16,046,267
July	34,123,992	1,327,874	1,318,556
August	32,459,844	1,453,909	1,326,443
September	36,901,003	1,432,378	1,145,406
October	27,965,148	1,247,115	1,069,343
November	32,694,793	1,210,868	1,274,446
December	32,140,569	1,373,234	1,202,069
The year 1926	400,167,883	17,137,056	14,315,695
1927			
January	33,433,429	1,640,177	1,495,455
February	29,575,096	1,483,713	1,121,256
March	38,915,857	1,540,356	1,326,260
April	39,793,078	1,840,163	1,798,880
May	35,969,289	1,147,365	1,494,808
Eleven months	373,695,813	17,215,429	14,573,036
Five months	176,686,910	9,798,630	7,234,710

Imports of Machinery Into the United States

(By Value)

	May		Five Months Ended May	
	1927	1926	1927	1926
Metal-working machine tools	$56,917	$46,153	$244,256	$197,445
Agricultural machinery and implements	536,118	700,964	3,124,228	2,842,157
Electrical machinery and apparatus	312,455	60,807	1,255,408	901,701
Other power-generating machinery	16,491	3,188	38,678	7,536
Other industrial machinery	1,516,578	547,485	4,166,026	3,721,623
Vehicles except agricultural	225,384	151,734	970,034	880,195
Total	$2,663,943	$1,510,331	$9,798,630	$8,550,657

Exports of Power-Driven Metal-Working Machinery

	May, 1927		April, 1927	
	No.	Value	No.	Value
Engine lathes	52	$84,175	61	$99,793
Turret lathes	20	83,020	15	44,564
Other lathes	35	44,710	27	45,530
Vertical boring mills and chucking machines	9	17,687	10	33,994
Thread-cutting and automatic screw machines	49	41,034	105	112,789
Knee and column-type milling machines	12	36,179	22	44,152
Other milling machines	33	47,926	46	86,755
Gear-cutting machines	42	131,588	29	77,186
Vertical drilling machines	16	42,755	20	25,979
Radial drilling machines	4	4,527	8	16,674
Sensitive drilling machines	90	2,969	61	9,600
Other drilling machines	106	17,595	54	19,397
Shapers and slotters	22	32,289	40	76,370
Planers	4	1,520	3	6,850
External cylindrical grinding machines	42	93,894	100	207,263
Internal grinding machines	22	59,910	53	116,995
Metal-working tool-sharpening machines	53	35,104	80	41,640
Total	611	$776,882	734	$1,065,501

Machinery Markets and News of the Works

MACHINERY TRADE QUIET

Progressive Decline in Bookings Brings Production Curtailment

Orders Are Scattered and Usually for Single Machines—Railroads and Automobile Companies Buy Lightly

AT the beginning of the second half of the year machine tool builders generally find that the volume of business is the lightest so far in 1927. The progressive decline in bookings during the past three months has brought curtailment in production in keeping with the widespread acceptance of the idea that business will continue to be restricted at least through July and August. With less business in sight, competition among sellers is keener. A price reduction has been announced on a line of standard shapers. Price concessions frequently take the form of fairly large allowances on old machines taken in trade.

Automobile companies and railroads, which at times provide the bulwark of machine tool purchasing, are taking tools only in a small way and there has been a decline also in the number bought by companies in the general industrial field.

The Chicago, Rock Island & Pacific has bought a number of tools, including a locomotive journal turning lathe and a steam hammer, and the Louisville & Nashville has ordered a driving wheel lathe. Otherwise railroad buying has been negligible. One of the largest purchases by an automobile company was a 40-ft. boring and turning mill.

New York

NEW YORK, July 5.

MACHINE tool buying in this district in the past week has been extremely light, the holiday period being partly responsible. Competition for business is becoming keener, and while builders of tools are quite generally maintaining price levels, the allowances that are frequently made on old tools taken in exchange have somewhat the same effect in changing values. An Eastern company has sold a 90-in. locomotive journal turning lathe and an 1100-lb. steam hammer to the Chicago, Rock Island & Pacific Railroad and a 90-in. standard driving wheel lathe to the Louisville & Nashville. Another large sale was a 40-ft. boring and turning mill to an automobile company in Wisconsin. A manufacturer at Towson, Md., bought a 13 x 36-in. lathe; a cash register company bought a jig borer, and a company at Sioux City, Iowa, bought an automatic centering machine.

Contract has been let by the Ideal Chair Co., 1406 Metropolitan Avenue, Brooklyn, to the White Construction Co., 95 Madison Avenue, New York, for a new three-story plant at Maspeth, L. I. The company will remove its present plant to the new location during the later part of the year, when the structure is scheduled for completion, and will install considerable additional machinery. The project will cost approximately $400,000.

The American Neon Light & Sign Corporation, New York, recently organized by Otto B. Shulhof, 1170 Broadway, former commissioner of the Port of New York Authority and associates, is planning the establishment of a new plant for the manufacture of Neon beacon lighting equipment for airplane service. A. E. Lefcourt, 1351 Broadway, and David Nickelsberg, president Fur Merchants' Warehouse Corporation, 238 West Twenty-eighth Street, also are interested in the new company.

The Kent Automatic Parking Garage, Inc., 350 Madison Avenue, New York, has purchased property at 209-11 East Forty-third Street, extending through to East Forty-fourth Street, about 100 x 200 ft., as a site for a new twenty-eight story service, repair and garage building, designed to accommodate more than 1000 automobiles at one time, to cost upward of $1,000,000 with equipment. Milton A. Kent, address noted, is one of the heads of the company and architect for the structure. Wilbur G. Hudson, head of the Wilbur G. Hudson Corporation, 50 Church Street, engineer, is also interested in the organization.

The Cummings Laundry Machinery Co., 57 Frost Street, Brooklyn, manufacturer of laundry machinery and parts, has plans for a new one-story plant to cost close to $45,000 with equipment. E. M. Adelsohn, 26 Court Street, is architect.

Fire, June 29, destroyed a portion of the plant of the C. M. Lane Life Boat Co., Provost Street, between Huron and India Streets, Brooklyn, manufacturer of boats and other river craft, with loss reported in excess of $65,000 including equipment. Plans for rebuilding are under consideration. The same fire also damaged part of the adjoining plant of the Stephen Jerry Cooperage Co., with loss of more than $20,000.

J. J. Gloster, 1440 Broadway, New York, architect, is completing plans for a new four-story automobile service, repair and garage building at 429-31 West Fifty-third Street, to cost about $110,000 with equipment.

The Board of Education, 500 Park Avenue, New York, plans the installation of manual training equipment in a new three-story high school on Rockaway Boulevard, Woodhaven, L. I., to cost $2,500,000, for which superstructure will soon begin. William H. Gompert, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

The Anaconda Copper Mining Co., 25 Broadway, New York, has completed plans for the initial units of its new electrolytic zinc plant at Anaconda, Mont., and will begin work soon. It is reported to cost close to $1,500,000 with machinery.

The Union Free School District No. 1, Willsboro, N. Y., contemplates the installation of manual training equipment in a new two-story high school to cost about $160,000, for which plans are being prepared by Pember & Demers, 24 James Street, Albany, N. Y., architects.

E. F. Volkmer & Son, 799 Greenwich Street, New York, manufacturer of electric lamp specialties, has awarded a general contract to James Sutherland, Inc., 133 South Fifteenth Street, Newark, for a new two-story plant, 50 x 85 ft., at Newark, to cost about $65,000.

The Essex County Board of Vocational Education, 969 Broad Street, Newark, has engaged Guilbert & Betelle, 24 Branford Place, architects, to prepare plans for a vocational school on North Thirteenth Street, to cost more than $450,000 with equipment.

The Steam Appliance Corporation, Newark, care of James J. Skeffington, 24 Commerce Street, recently formed with a capital of $100,000 to manufacture domestic heating equipment, has leased the four-story and basement factory at 84-88 Mechanic Street, for a new plant and will install equipment at once. The company is headed by Paul J. O'Neill and David E. Feldman.

David Kahn, 67-69 Paterson Plank Road, North Bergen, N. J., manufacturer of fountain pens and kindred specialties, has asked bids on a general contract for a two-story addition to cost about $35,000. Barney Singer, 778 Boulevard, Bayonne, N. J., is architect.

Flash Mechanical Devices, Inc., 126 Liberty Street, New York, has been organized with a capital stock of $50,000 to manufacture speedy functioning devices, particularly a tool for the utilization of cast off razor blades. For the present, work is being done under contract.

New England

BOSTON, July 5.

BUSINESS with both new and used machine tool dealers in this district has fallen to a low point. Used tools sold included a 14-in. x 6-ft. Prentiss lathe, a two-spindle drill, a small shear, a press, a used tool grinder and miscellaneous bench tools. New inquiries have also fallen off abruptly.

The large Massachusetts industries are buying almost no machine tools. Machine tool builders have bought some equipment this year, and a Rhode Island plant is still negotiating on two fairly large and expensive tools. Textile machinery and paper mill machinery makers are busier, but because of a previous depression are reluctant to purchase new equipment.

In the closing days of June there was a decided slump in small tool sales. At the beginning June promised to be a good month, but estimates are that it will fall below expectations.

The new high school in the city of Bedford, Mass., will house a mechanical shop. The shop now in the grammar school will be transferred to the high school and new equipment will be required.

Bird & Sons, Inc., East Walpole, Mass., roofing material, is taking bids for a one-story turbine room extension. Plans are private.

Work has started at Westfield, Mass., on a local airport station, which includes a large hangar, a part of which will be utilized as a machine shop. Equipment will be required.

Harry L. Leacham, 120 Front Street, Worcester, Mass., architect, is taking bids for a two-story, 50 x 60 ft. garage and repair shop for the Auto Service Co., Inc., 117 Mechanic Street, Fitchburg, Mass. August Suomi is the owner.

Plans have been completed by Klug & Smithe, 69 East Wisconsin Avenue, Milwaukee, architects, for a plant for the Heil Co., Milwaukee, on North Beacon Street, Brighton, Boston. C. H. Zarse, 298 North Harvard Street, Brighton, is in charge of the work.

Work has been started by the William Underwood Co., Walnut Street, Watertown, Mass., canned goods, on a one and two-story, 200 x 205 ft. plant and warehouse. The company proposes to enlarge its machine shop. Monks & Johnson, 99 Chauncy Street, Boston, are the engineers.

The car shops of the Boston & Maine Railroad, Concord, N. H., closed June 30 and will reopen July 18. During that period there will be a reorganization of the operating force and in the mechanical equipment. It is proposed to increase the output from nine to 33 cars per working day.

The plant of the Ford Motor Co., Somerville, Mass., erected a few months ago has been closed until fall. Some 800 workmen are released. While authentic reports are not obtainable, it is intimated the assembling facilities will be revamped and considerable new equipment added.

The Central Maine Power Co., Augusta, Me., has concluded negotiations for the purchase of the plant of the Bath Iron Works, Bath, Me., for a mechanical division for electrical equipment, etc. The company is reported to be planning the early installation of additional machinery.

The Hospital Department, Boston, J. P. Manning, director, is revising plans for an addition to the steam power plant on Albany Street, including improvements in the present station, to cost $180,000 with equipment.

The Arrow Electric Co., Hartford, Conn., manufacturer of electric plugs, switches, wiring devices, etc., is disposing of a preferred stock issue of $2,000,000, a portion of the fund to be used for expansion, including an addition to its local plant, 106 x 114 ft., and 37 x 300 ft. The company also operates a branch factory at Washington, N. J. Edward R. Grier is vice-president and general manager.

The United Illuminating Co., New Haven, Conn., is said to be planning a call for bids on a general contract early in July, for an addition to its electric generating station, to cost close to $1,000,000 with equipment. Westcott & Mapes, New Haven, are architects and engineers.

The Pratt & Whitney Aircraft Co., Hartford, Conn., a subsidiary of the Pratt & Whitney Co., is planning early increase in facilities and production at its plant. The company has contracted with the Navy Department for aircraft motors and parts of Wasp nine-cylinder type, with order totaling close to $500,000. Negotiations are said to be pending for another contract from the same source, aggregating about $1,000,000.

The City Council, Methuen, Mass., is reported to be planning the installation of pumping equipment in connection with proposed extensions and improvements in the municipal waterworks to cost $350,000.

The Whitney Mfg. Co., Hartford, Conn., manufacturer of chains, sprockets, etc., has arranged for an increase in capital from $150,000 to $1,500,000, a portion of the proceeds to be used for expansion.

Buffalo

BUFFALO, July 5.

CONTRACT has been let by the New York Central Railroad Co., Buffalo, to E. P. Muntz, Inc., Lehigh Valley Terminal Building, for a new one and two-story locomotive repair shop and signal station at Chili Junction, N. Y., to cost close to $40,000. Headquarters are at 466 Lexington Avenue, New York.

The Lake Ontario Power Corporation, Sodus, N. Y., operating the Sodus Gas & Electric Co.; Marion Power Corporation, Marion; and the Northern Cayuga Light & Power Corporation, Cato, N. Y., recently acquired by purchase, has arranged for a bond issue of $1,000,000 and stock issue of $500,000, a portion of the fund to be used in connection with the acquisition of the companies, and for proposed additions to hydroelectric generating plants and transmission lines.

The Beaver Products Co., Inc., Beaver Road, Buffalo, manufacturer of wallboard specialties, has secured the patent rights in the United States for the production of Elo panels, formed of cement and other products, manufactured in England for the past two years. Extensions will be made in the plant and additional equipment installed for the new branch of production. It is expected to begin manufacture in about six months.

E. A. Howard, Everson Building, Syracuse, N. Y., architect, will take bids at once for a proposed three-story automobile service, repair and garage building to cost in excess of $100,000 with equipment.

The Republic Light, Heat & Power Co., Jackson Building, Buffalo, is planning extensions and improvements in its artificial gas plant at Oakfield, N. Y., including installation of additional machinery.

Detroit

DETROIT, July 5.

THE Parker Rust-Proof Co., Inc., 2177 East Milwaukee Street, Detroit, is completing plans for a one-story addition to its plant at Morenci, Mich., to cost $50,000 with equipment. R. C. Bristol is president.

The Mathews Industries, Inc., 685 Mullett Street, Detroit, metal products, etc., is reported to be considering the establishment of a new plant at Mount Clemens, Mich. It is purposed to use the former plant of the Sauzedde Wheel Co., Mount Clemens, and remove the present Detroit business to that location.

The National Spring & Wire Co., Grand Rapids, Mich., is completing plans for an addition totaling about 5000 sq. ft. of floor space.

The Standard Oil Co., 910 South Michigan Avenue, Chicago, and South Washington Street, Saginaw, Mich., is having plans prepared for a new refinery at Saginaw, vicinity of the new oil field section, to cost about $275,000 with machinery. Fred Stolz is construction superintendent.

The Michigan Public Service Co., Ludington, Mich., and vicinity, organized to take over and operate a group of electric utility properties, is disposing of a bond issue of $2,000,000, a portion of the proceeds to be used for general expansion and betterments. The company is under the direction of A. E. Fitkin & Co., 165 Broadway, New York. A. E. Fitkin is head of both organizations.

The Board of Education, Romeo, Mich., contemplates the installation of manual training equipment in a proposed new high school to cost $150,000, for which bids are being asked on a general contract until July 11. The Warren, Holmes & Powers Co., Capitol Savings & Loan Building, Lansing, is architect. L. E. Bedell, president of the board, is in charge.

The Port Huron Sulphite & Paper Co., Port Huron, Mich., is disposing of a bond issue of $300,000, a portion of the fund to be used for extensions and improvements.

The Murray Body Corporation, Russell and Aberle Streets, Detroit, manufacturer of automobile bodies, springs, etc., has concluded negotiations for the purchase of the plant and business of the Jenks & Muir Mfg. Co., 6441 Hastings Street, manufacturer of springs, etc., and will continue as a unit of its organization under the Jenks & Muir name. Christopher E. Coda will remain as vice-president and general manager in charge of the plant.

The Crane Market

CURRENT inquiry for both electric overhead and locomotive cranes is small, being largely confined to single pieces of equipment. In the locomotive crane field the list of three cranes for the Amtorg Trading Corporation and the two cranes for the New York Central Railroad are still open. In overhead cranes, however, two outstanding lists have been placed, the five overhead cranes for the Lidgerwood Mfg. Co. and the 44 overhead cranes and 13 crane bridges for the Baldwin Locomotive Works, Eddystone, Pa. E. L. Phillips & Co., enginers, 50 Church Street, New York, are expected to close in a few days on the 100-ton, 4-motor overhead crane for the Long Island Lighting Co.

The Wisconsin Appleton Co., South Milwaukee, is in the market for three small cranes including two 1-ton to 2-ton capacity for an annealing room. The Heil Co., Milwaukee is in the market for a 3-ton overhead crane for its new Boston plant.

Among recent purchases are:

Baldwin Locomotive Works, Eddystone, Pa., 44 10-ton, 37-ft. 2-in. span electric overhead cranes, 12 10-ton, 37-ft. 2-in. span crane bridges and one 20-ton, 74-ft. 8-in. span crane bridge, reported purchased from the Niles Crane Corporation.

Nekoosa-Edwards Paper Co., Port Edwards, Wis., a 30-ton standard locomotive crane from the American Hoist & Derrick Co.

Backus-Brooks Co., Minneapolis, Minn., lumber manufacturer, a 25-ton locomotive crane from the American Hoist & Derrick Co.

Ulster-Davis Co., Albany, N. Y., a 15-ton, Diesel engine driven, crawl-tread locomotive crane from the American Hoist & Derrick Co.

Anchor Post Iron Works, Garwood, N. J., one 5-ton and one 2-ton overhead cranes, for Baltimore from an unnamed builder.

Lidgerwood Mfg. Co., 96 Liberty Street, New York, one 25-ton and two 10-ton cranes from a Wisconsin builder and two 2-ton from a Michigan builder.

Carbide & Carbon Chemical Corporation, Charleston, W. Va., a 15-ton, 48-ft. span overhead crane from the Northern Engineering Works.

Missouri Pacific Railroad Co., Kansas City, Mo., a 25-ton, 69-ft. span electric traveling crane from the Shaw Electric Crane Co.

National Zinc Co., Bartlesville, Okla., a 5-ton, 50-ft. span bucket crane from the Shaw Electric Crane Co.

Western Electric Co., Chicago, three 7½-ton and one 10-ton electric traveling cranes from the Whiting Corporation.

United Iron & Wire Works, Chicago, a 5-ton hand power crane from H. D. Conkey & Co., through Page & Ludwick.

The Oakland Motor Car Co., Pontiac, Mich., has taken no action on building a foundry in connection with its new automobile plant. Detailed plans were made for a foundry some time ago by the Austin Co., Cleveland, but bids have not been asked for and it is not expected that the Oakland Co. will go ahead with the foundry this year.

Chicago

CHICAGO, July 5.

THE machine tool market in this district is more quiet than at any time this year. Only a few scattered orders have been placed this week and new inquiries are of small volume. The Rock Island has purchased an 18-in. x 36-in. gap lathe, a 36-in. planer and two 32-in. upright drills and is inquiring for several portable electric drills. The Chicago, Milwaukee & St. Paul is asking for prices on a squaring shear with 24-in. gap to cut soft steel up to 3-16-in. thick, and a 12-in. hand planer and jointer. The Burlington will buy several portable electric drills. No purchases have been made aganst the list issued last spring by the Omaha Lines of the Chicago & North Western.

With less business in sight competition is more keen, especially on special production machinery, and a reduction in price has been announced on one line of standard shapers.

The Russell Grader Mfg. Co., 2037 University Avenue, S. E., Minneapolis, Minn., is said to be arranging a call for bids in about 30 days for a one-story addition to cost more than $40,000. E. R. Ludwig, Essex Building, is architect, associated with Sund & Dunham, same address, architects.

In conjunction with the Public Service Co. of Colorado, Denver, the Colorado Interstate Gas Co., operated by the Prairie Oil & Gas Co., Independence, Kan., is planning the construction of a pipe line from the vicinity of Amarillo, Tex., to Denver, for natural gas transmission, to cost more than $2,000,000 with compressor stations, etc. Branch lines are also proposed to Pueblo and Colorado Springs.

The Santa Fe, Western Division, Denver, Colo., is reported to be planning the construction of a new repair plant with power house, at Pueblo, Colo., to cost more than $750,000 with equipment.

The Whiting Corporation, Harvey, Ill., manufacturer of cranes, hoists, foundry equipment, etc., will take bids at once for a one-story addition to cost about $35,000. Perkins, Chatten & Hammond, 160 North La Salle Street, Chicago, are architects.

The Chicago, Milwaukee, St. Paul & Pacific Railroad Co., 80 East Jackson Boulevard, Chicago, has begun the erection of three one-story repair shops, 40 x 80 ft., and smaller, at Tomah, Wis.

The Department of Public Works, State of Illinois, Springfield, has completed plans for a new two-story industrial arts building at the Eastern Illinois State Normal School, Charleston, to cost $175,000 with equipment. J. A. Nyden, Transportation Building, Chicago, is architect.

The Common Council, Pinedale, Wyo., is planning the installation of a municipal electric light and power plant. Estimates of cost will soon be made and bond issue arranged.

Fire, June 27, destroyed a portion of the plant of the Unico Motor Products Corporation, 4969-71 St. Louis Avenue, Chicago, manufacturer of piston rings, etc.

The Club Aluminum Utensil Co., Chicago, has been formed under State laws with capital of 300,000 shares of stock, to take over and expand the Club Aluminum Development Co., 544 Lake Shore Drive, manufacturer of aluminum kitchen utensils. The new organization plans the early sale of a stock issue of 50,000 shares, a portion of the fund to be used for expansion.

The Board of Education, Mankato, Minn., plans the installation of manual training equipment in its proposed Franklin junior high school to cost about $200,000, for which bids will be asked on a general contract in about 60 days. George Pass & Son, Eckle Building, are architects.

The National Lock Co., Rockford, Ill., is having plans drawn for a one-story machine shop addition, for which bids will soon be asked on a general contract. Weiss & Niestadt, 53 West Jackson Boulevard, Chicago, are architects.

The Whiting Corporation, Harvey, Ill., maker of cranes, foundry equipment and railroad specialties, has appointed the following representatives: Eichman Machinery Co., 21 Manufacturers Exchange Building, Kansas City, Mo., in Kansas and western Missouri; Huey & Philp Hardware Co., Dallas, Tex., in Oklahoma and Texas excepting the southeastern counties of the latter State; L. H. Staley, Whitney-Central Building, New Orleans, in Louisiana, southern Mississippi and Mobile, Ala.; H. B. Wilson Co., St. Louis, present territory extended to include Arkansas, but not Oklahoma.

The Paul Maehler Co., 2210 West Lake Street, Chicago, builder of industrial ovens, has acquired property adjoining its present factory which will be altered to form a machine and steel shop addition. The property when completed will be 150 x 135 ft. Present offices of the company will be rearranged and placed on the second floor.

The Strom Steel Ball Co., whose former plant at Oak Park, Ill., was destroyed by fire last March, is now in operation in a new plant located at 1842 South Fifty-fourth Avenue in the Cicero industrial district and consisting of 41,000 sq. ft. of ground space and a daylight structure of one story with 35,000 sq. ft. of floor space. The new plant has 75 per cent greater capacity than the old one. The company has grown from a small beginning to one of the largest steel ball manufacturers in the country. G. A. Strom is president and general manager, R. H. Coolidge is treasurer and H. E. Johnson is secretary.

The Gilbert Mfg. Co., Aberdeen, S. D., maker of corrugated culverts, has removed its plant and general offices to Stillwater, Minn.

J. W. Bettendorf, president Bettendorf Co., railroad car manufacturer and steel plant, is head of the new Bettendorf Oil Burning Co., incorporated with $250,000 capital stock to manufacture a new oil burner. Production will begin in the plant of the Davenport Mfg. Co., Davenport, Iowa, about Aug. 1.

Cleveland

CLEVELAND, July 5.

SALES of machine tools continued light the past week and the volume of business was less than in May. Some machine tool manufacturers report an improved outlook for July and believe that the end of the year will show that June was the worst month of 1927 from the standpoint of sales. Dealers' sales are confined to single machines from scattered sources. An outstanding problem of the local dealers at present, evidently more pronounced than heretofore, is resulting from the desire of a large share of prospective purchasers to trade in one or more old machines for new tools. Many manufacturers feel the need of new and more modern equipment, but with curtailed plant operations they want to limit their expenditures for new tools by trading in old machines.

Recent contracts taken by the Austin Co., Cleveland, include the following: Ohio Forge Co., Cleveland, one-story machine shop, 50 x 80 ft.; Gould Pumps, Inc., Seneca Falls, N. Y., one-story foundry addition for cleaning department, 35 x 105 ft.; Anchor Post Fence Co., Garwood, N. J., new plant at Baltimore, Md., one story, 200 x 500 ft.; American Electrical Works, Phillipsdale, R. I., one-story machine shop, 110 x 130 ft.; Wildman Mfg. Co., Norristown, Pa., manufacturer of knitting machinery, one-story machine shop, 200 x 300 ft.; Wisconsin-Appleton Co., Milwaukee, new foundry 40,000 sq. ft. of floor space, one and 5-ton crane equipment will be required; Penn State College, State College, Pa., shop and storage building 32,000 sq. ft.

The Galion Metallic Grave Vault Co., Galion, Ohio, has asked bids on a general contract for a new one-story plant, to cost about $35,000 with equipment. Althouse & Jones, Market Building, Mansfield, Ohio, are architects. E. P. Monroe is secretary.

The Marble & Shattuck Chair Co., 10200 Foster Avenue, Cleveland, is having plans drawn for a new four-story and basement plant, 66 x 120 ft. and 85 x 100 ft., to cost approximately $200,000 with equipment. H. M. Morse & Co., Finance Building, are architects. T. W. Foote is general manager.

The Northern Ohio Power & Light Co., Akron, Ohio, is disposing of a bond issue of $1,900,000, a portion of the proceeds to be used for expansion and betterment.

The Union Metal Mfg. Co., Maple Avenue, Canton, Ohio, manufacturer of metallic columns, posts, etc., is completing plans for a one-story addition, 50 x 100 ft., to cost about $45,000 with equipment. R. O. Karchner is company engineer.

South Atlantic States

BALTIMORE, July 5.

BIDS will soon be asked by the Standard Wholesale Phosphate & Acid Co., Continental Building, Baltimore, for a new two-story plant in the Curtis Bay district for the manufacture of sulphuric acid and kindred specialties, to cost more than $400,000 with machinery. George S. Whiting is president.

The Southern Power Co., Charlotte, N. C., is reported to be planning the construction of three steam-operated electric generating plants for emergency service in supplanting hydroelectric power stations during water shortage. One of the stations will be located between Salisbury and Winston-Salem, another between Spartanburg and Gastonia, and a third at a point further south. The entire project is scheduled to be carried out within 12 months, with total cost reported in excess of $600,000.

The Washington Gas Light Co., 413 Tenth Street, Washington, has completed plans for a four-story automobile service, repair and garage building for company cars and motor trucks to cost about $250,000 with equipment. James S. McIlhenny is company engineer.

The Sharber & White Hardware Co., Elizabeth City, N. C., is said to be planning to rebuild the portion of its storage and distributing plant, recently destroyed by fire, with loss estimated at close to $50,000 with equipment.

The Board of School Commissioners of Dorchester County, Cambridge, Md., is said to be considering the installation of manual training equipment in a proposed two-story high school to cost $175,000, for which plans will be drawn by Henry P. Hopkins and A. C. Burton, 547 North Charles Street, Baltimore.

Fire, June 29, destroyed a portion of the plant and shaft building and equipment at mine No. 12 of the Consolidation Coal Co., Bordenshaft, Frostburg, Md., with loss reported at more than $115,000 including machinery. Headquarters are in the Continental Building, Baltimore.

The Sea Island Utilities, Brunswick, Ga., operated by the Sea Island Co., same address, is planning the construction of a new steam-operated electric power plant for service at St. Simons Island and vicinity, to cost in excess of $65,000. Paul J. Varner is vice-president and general manager.

The National Electric Supply Co., 1330 New York Avenue, Washington, has awarded a general contract to the S. J. Prescott Co., 814 Thirteenth Street, N. W., for an addition to its storage and distributing plant to cost close to $100,000 with equipment. Fred B. Pyle, 1420 New York Avenue, N. W., is architect.

The Department of Public Works, Charleston, S. C., J. E. Gibson, manager and engineer, contemplates the construction of a pumping plant on the Ashley River, in connection with proposed extensions in the municipal waterworks to cost about $450,000. J. W. Ledoux, 112 North Broad Street, Philadelphia, is consulting engineer.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a horizontal return tubular boiler, about 35-hp. capacity, with accessories.

W. M. Townsend, 12 Rogers Street, Norfolk, Va., is at the head of a project to construct and operate an ice-manufacturing plant to cost more than $30,000 with equipment.

The Common Council, Americus, Ga., is considering the installation of pumping machinery in connection with proposed extensions in the municipal waterworks and sewage systems, for which a bond issue of $68,000 recently was approved.

The Rogers Trading Co., Millen, Ga., is said to have tentative plans under way for a new ice-manufacturing plant to cost upward of $25,000 with equipment.

Cincinnati

CINCINNATI, July 2.

MACHINE tool buying continues sporadic. With few exceptions sales have consisted of single tools from widely diversified sources, and indications are that the volume of business during July and August will be light. The decline in bookings the past three months has resulted in further restriction of production. Railroad purchases have been negligible, and automobile makers have contracted for only a small amount of equipment the past week.

The International Derrick & Equipment Co., Michigan Avenue, Columbus, Ohio, has awarded a general contract to J. W. Heckert, 5 East Long Street, for a three-story addition, to cost approximately $100,000 with equipment.

The Gas Products Co., Columbus, Ohio, has awarded a general contract to the Van Blarcom Co., National City Building, Cleveland, for a new acetylene plant at Cleveland, to cost close to $70,000 with equipment. A boiler plant will be installed. S. D. Winger is president.

Ovens, power equipment, conveying and other machinery will be installed in the three-story and basement plant to be constructed by the Dayton Bread Co., Dayton, Ohio, to cost $120,000. Heald & Pickerel, Dayton Saving & Trust Building, are architects, in charge.

S. R. Read, Chattanooga, Tenn., care of Louis H. Bull, Volunteer Life Building, architect, is at the head of a project to construct a new multi-story automobile service, repair and garage building, to cost more than $350,000 with equipment.

The St. Louis-San Francisco Railway, Railway Exchange Building, St. Louis, has awarded a general contract to the C. G. Kershaw Contracting Co., Woodward Building, Birmingham, for a new engine house, 110 x 650 ft., with repair facilities, at Yale, Tenn., to cost approximately $80,000 with equipment.

The Miller Foundry Co., Columbus, Ohio, has completed plans for a new one-story foundry, to cost about $40,000 with equipment. It is expected to begin work in July.

E. R. Howard, 109 East Seventh Street, Chattanooga, Tenn., and associates have awarded a general contract to the Stewart Construction Co., Ferger Building, for a two-story automobile service, repair and garage building, 100 x 235 ft., to cost about $125,000 with equipment.

The City Council, Nashville, Tenn., is asking bids until Aug. 10 for a rapid sand filtration plant for the municipal waterworks, including mixing machinery, plunger type elevator, monorail hoisting equipment, operating table, wash water controllers, flow gages, etc., and steel tank, 40 ft. in diameter and 20 ft high. The J. N. Chester Engineers, Union Bank Building, Pittsburgh, are engineers.

The Columbus Bolt Works, Inc., 276 West Street, Columbus, Ohio, has awarded a contract to the Stefco Steel Co., Michigan City, Ind., for a one-story addition.

The Hamilton Caster Mfg. Co., Dixie Highway, Hamilton, Ohio, is having plans prepared for a two-story addition to cost about $40,000. G. Barkman, Reilly Building, is architect.

Philadelphia

PHILADELPHIA, July 5.

THE Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, has received permission to secure the last four parcels of land necessary for the completion of its new hydroelectric generating plant at Conowingo, Md., on which work has been begun. A steel tower transmission line will be constructed to Philadelphia. The entire project will cost approximately $30,000,000.

R. R. Kohn, 1720 North Creighton Street, Philadelphia, architect, is completing plans for a new two-story and basement automobile service, repair and garage building, 55 x 175 ft., to cost close to $100,000 with equipment.

The Federal Electric Sign Co., Philadelphia, manufacturer of electric signs and displays, has leased space in the building at 128 South Nineteenth Street, for a new works.

Wolf Brothers, Twelfth and Callowhill Streets, Philadelphia, manufacturer of paper goods, have awarded a general contract to the F. V. Warren Co., 1913 Arch Street, for extensions and improvements in its four-story and basement plant, 95 x 135 ft., to cost $50,000. Percival M. Sax, Penfield Building, is architect.

The Roberts Nash Motor Co., 1235 North Broad Street, Philadelphia, local representative for the Nash automobile, is having plans drawn for a five-story addition to its service, repair and sales building, to cost in excess of $100,000 with equipment. Philip S. Tyre, 114 South Fifteenth Street, is architect.

The Walter P. Miller Co., 452 York Avenue, Philadelphia, manufacturer of paper goods, will soon begin the construction of a new four-story and basement addition, 80 x 92 ft., to cost more than $85,000 with equipment. Harris & Richards, Drexel Building, are architects.

Ralph B. Bencker, Bellevue Court Building, Philadelphia, architect, has completed plans for a one-story and basement automobile service, repair and garage building, 160 x 265 ft., with extension, 80 x 120 ft., to cost about $150,000 with equipment.

The Camden County Board of Vocational Education, Camden, N. J., will soon ask bids on a general contract for a two-story vocational school on the Browning Road, Merchantville, N. J., to cost more than $500,000 with equipment. Lackey & Hettle, 5 Hudson Street, Camden, are architects.

The Patterson-Kelley Co., East Stroudsburg, Pa., manufacturer of hot water heaters, parts, etc., has work under way on a one-story addition, 70 x 100 ft. Additional equipment will be installed.

The Keystone Portland Cement Co., Commonwealth Building, Allentown, Pa., organized several months ago to construct a mill at Bath, Pa., has awarded a general contract to the M. A. Long Co., 10 West Chase Street, Baltimore, for the initial units. The plant is estimated to cost in excess of $1,000,000 with machinery. Richard K. Meade & Co., 10 West Chase Street, Baltimore, are engineers. John Buckland is president.

The Board of Education, Lock Haven, Pa., is said to be planning an early call for bids for a new two-story and basement high school, with manual training shops, to cost close to $230,000 with equipment. Lowrie & Green, Harrisburg, Pa., are architects.

Tunis & Baker, 1600 Arch Street, Philadelphia, architects, are completing plans for a new four-story automobile service, repair and garage building at Upper Darby, Pa., to cost in excess of $100,000 with equipment.

The Manganese Steel Forge Co., Richmond Street and Erie Avenue, Philadelphia, has opened a branch office in Chicago. W. H. Potter, 1335 Old Colony Building, is in charge. The company reports a growing demand for its screens and other products of manganese steel.

St. Louis

ST. LOUIS, July 5.

BIDS will be asked late in July by the Century Electric Co., 1806 West Pine Street, St. Louis, manufacturer of fans, motors, etc., for a one-story foundry addition, to cost upward of $150,000 with equipment. L. P. Pendleton, Demenil Building, is architect.

The Board of Education, Earlsboro, Okla., is considering the installation of manual training equipment in a proposed two-story high school to cost $180,000, for which bids will soon be asked on a general contract. J. J. Davis, Shawnee, Okla., is architect.

The Chouteau Avenue Auto & Wagon Co., 2118 Chouteau Avenue, St. Louis, manufacturer of automobile bodies, etc., has filed plans for a one-story and basement addition, 60 x 100 ft., to cost $25,000. Jacob Heim, Holland Building, is architect.

Miller & Craig, 126 South Eleventh Street, Lincoln, Neb., architects, are completing plans for a new three-story automobile service, repair and garage building, 50 x 140 ft., to cost about $85,000 with equipment.

The Cadwallader Furniture Mfg. Co., 1010 Q Street, Lincoln, Neb., has preliminary plans for an addition and improvements in the present plant, to cost approximately $65,000. Davis & Wilson, 525 East Thirteenth Street, are architects.

The Empire Gas & Fuel Co., Bartlesville, Okla., will soon begin the construction of its proposed pipe line from Wichita, Kan., to the Panhandle district, Tex., for natural gas distribution, to cost in excess of $16,000,000.

R. H. Sanneman, Lee Building, Kansas City, Mo., architect, has work under way on a one-story and basement automobile service, repair and garage building, 115 x 170 ft., to cost about $85,000 with equipment.

The City Council, Macon, Mo., will take bids early in August for extensions and improvements in the municipal electric light and power plant, and waterworks, with installation of additional equipment, estimated to cost $160,000. The Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

The H. W. Underhill Construction Co., Braniff Building, Oklahoma City, Okla., has taken a contract for a three-story and basement automobile service, repair and garage building, 75 x 145 ft., at Wewoka, Okla., to cost about $90,000, with equipment.

The St. Louis office service station and warehouse of the Chicago Pneumatic Tool Co., New York, have been moved from 813 Hempstead Street to 1931 Washington Avenue.

The Linde Air Products Co., New York, has broken ground for a new plant to cost $250,000, at Wichita, Kan.

Pittsburgh

PITTSBURGH, July 5.

THE Westinghouse Electric & Mfg. Co. has issued its third-quarter machine tool list, and while it is small by comparison with typical lists of this company, it has at least 25 items on which machine tool manufacturers and dealers will quote. There have been intimations that the list contained only six items, but that number refers solely to the tool requirements of the Trafford City, Pa., works.

General machine tool business is rather slow, although not stagnant. One local firm reports sales in the past week of a 36-in. and a 26-in. open-side planer shaper, and a 24-in. lathe. Many dealers have had some single item orders.

Bids will be received by the Board of Public Education, Fulton Building, Pittsburgh, until July 14 for boilers, temperature regulating equipment, motors, fans, unit heaters and other mechanical equipment for the David B. Oliver High School. George W. Gerwig is secretary.

Contract has been let by the General Motors Corporation, Detroit, to the Everett Winters Co., 1561 East Grand Boulevard, for its proposed two-story and basement factory branch, service and repair building, 175 x 220 ft., on Liberty Avenue, Pittsburgh, to cost about $375,000. Albert Kahn, Inc., Marquette Building, Detroit, is architect.

The Carbon & Chemical Corporation, South Charleston, W. Va., will soon begin the construction of a power house addition, to cost upward of $65,000 with equipment.

The Board of Education, Wellsburg, W. Va., is considering the installation of manual training equipment in a proposed new high school to cost $225,000, for which bids will be asked soon on a general contract. C. W. Bates, 77 Twelfth Street, Wheeling, W. Va., is architect.

The Island Creek Coal Co., Fourteenth Street, Huntington, W. Va., will soon begin the construction of a new steel tipple, mechanical fan house, electric substation and other structures. The entire project is reported to cost more than $150,000. J. D. Francis is vice-president.

The Englert McKean Auto Co., 2134 Brownsville Road, Pittsburgh, has filed plans for a new two and three-story service, repair and sales building, 80 x 100 ft., to cost about $160,000, for which a general contract has been let to A. & S. Wilson Co., 504 Third Avenue, Pittsburgh.

The United States Engineer, Huntington, W. Va., is asking bids until July 12 for 1000 lb. of babbitt metal, pipe fittings, unions, ells, etc., circular 135.

The Board of Education, Emlenton, Pa., is said to be planning the installation of manual training equipment in a proposed two-story high and grade school to cost $200,000, for which bids are being asked on a general contract. Crosby & Crosby, Oil City, Pa., are architects.

Milwaukee

MILWAUKEE, July 5.

JUNE bookings by local machine tool builders have been somewhat larger than expected, although the volume fell considerably below the corresponding period of 1926. Deliveries were in excess of new orders and most shops entered July with a smaller supply of work than at the close of May. Inquiry shows some improvement, especially among the larger automotive shops. Sources of inquiry are being carefully guarded.

The Milwaukee Department of Public Works is asking sealed bids until July 15 for furnishing and erecting one 40,000,000-gal. geared turbine driven centrifugal pumping unit in the Riverside pumping station. A bond of $24,000, or check for $12,000, is required with each tender. Joseph P. Schwada is city engineer.

The Wisconsin Appleton Co., South Milwaukee, formerly the Stowell Co., malleable castings, hardware, etc., has placed the complete contract with the Austin Co., Cleveland, for erecting three additional buildings aggregating about 30,000 sq. ft. of floor space. Inquiry is being made for equipment, including cranes and soft cleaning room devices.

H. A. Schmitt, village engineer, Shorewood, Post Office Milwaukee, will close bids Aug. 1 on the mechanical equipment for the proposed new municipal garbage incinerator plant, and for a general automotive storage and service plant, 50 x 112 ft., for village machinery and equipment. Plans are by H. C. Hengels, architect, 445 Milwaukee Street, Milwaukee.

The Board of Education, LaCrosse, Wis., is asking bids until July 20 for all of the equipment of the Logan High School, which includes a complete machine shop, garage, wood-working department, physics and chemistry laboratories, etc. The building is to be ready about Sept. 15.

The Prentiss-Wabers Co., 1430 North Second Street, Wisconsin Rapids, Wis., contemplates the erection of a one-story addition, 50 x 200 ft., to enlarge its output of camp cook stoves, hot blast heaters and other sheet metal specialties. R. A. Wiltrout is general manager.

The Northern States Power Co., 2 South Barstow Street, Eau Claire, Wis., will begin clearing the site Aug. 1 for the construction of a hydroelectric generating plant and dam on the Chippewa River at Chippewa Falls, Wis., to cost approximately $3,000,000. The project is in charge of the Byllesby Engineering & Management Corporation, 231 South LaSalle Street, Chicago, which will place contracts for the steel, as well as all equipment, through its office.

The Wood County Highway Commission, Wisconsin Rapids, Wis., is having plans made for a fireproof building, 60 x 150 ft., one and two stories, for warehousing and servicing all of the mechanical equipment. Ed Morris is commissioner.

Gulf States

BIRMINGHAM, July 5.

THE Texas & Pacific Railroad Co., Dallas, Tex., will begin work on its proposed engine house and car shops at Fort Worth, Tex., to cost close to $500,000 with equipment. A general contract has recently been let to the Austin Co., Dallas. E. F. Mitchell is chief engineer.

The Stover Lumber Co., Crichton, Ala., will rebuild the portion of its main mill destroyed by fire June 24, with loss reported in excess of $115,000 including machinery.

The Central Power & Light Co., Frost Building, San Antonio, Tex., is said to be planning the construction of a one-story steam-operated electric generating plant at Shamrock, Tex.

J. H. Lester, Morgan and North Bay Streets, Tampa, Fla., has plans for a new one-story ice-manufacturing plant at Frostproof, Fla., to cost about $27,000 with equipment.

The City Commission, Dallas, Tex., has authorized the establishment of a municipal automobile service, repair and garage building and will convert the city barns on Henry Street for this purpose. Complete machine shop and repair facilities will be provided. Roy B. Eastus will be superintendent of the plant.

The S. B. Adams Lumber Co., Mobile, Ala., care of S. B. Adams, 308 South Georgia Avenue, recently formed by Mr. Adams and associates, is said to have concluded negotiations for the purchase of the plant and property of the Moore Stave Co., Three Mile Creek, and will make extensions and improvements. Machinery will be installed for a department for the manufacture of hardwood flooring. Alan G. Knox is also interested in the organization.

The School Board of Dade County, Miami, Fla., is planning the installation of manual training equipment in a new four-story and basement high school, estimated to cost $475,000, for which superstructure will soon begin.

The Comal Power Co., New Braunfels, Tex., contemplates extensions in its power plant, including the installation of a new 60,000-kw. generating unit and auxiliary equipment.

The W. A. Ragsdale Rotary Engine Co., care of W. A. Ragsdale, Granada, Miss., second vice-president, is planning the early establishment of a plant at New Orleans for the manufacture of a patented rotary engine, including parts and assembling departments. The unit is of stationary type and weighs close to 4000 lb. The company was organized recently under Mississippi laws with capital of $500,000. A. C. Anderson is president; W. Q. Stroud, vice-president, and Taylor Bynum, secretary and treasurer.

The Northern Texas Traction Co., 400 Main Street, Fort Worth, Tex., has plans for a one-story automobile service, repair and garage building for company motor buses, to cost close to $70,000 with equipment. A. E. Townsend is general manager.

The Santa Fe System, Dallas, Tex., has plans for new repair shops at Clebourne, Tex., to cost in excess of $80,000 with equipment.

The Valley Refrigeration & Canning Corporation, Edinburg, Tex., is reported preparing plans for a new one-story cold storage and refrigerating plant, to cost more than $25,000 with equipment.

Indiana

INDIANAPOLIS, July 5.

BIDS will be asked at once by the Ross Gear & Tool Co., Lafayette, Ind., for a one-story and basement addition, 66 x 68 ft., forming top story on present factory, to cost about $24,000. Walter Scholer, Painters' & Decorators' Building, is architect.

Fire, June 25, destroyed a portion of the plant of the George W. Grimes Foundry Co., Bluffton, Ind., with loss reported at close to $45,000 including equipment.

The Board of County Commissioners, Court House, Angola, Ind., is asking bids until Aug. 1 for a one-story central power house to cost $23,000. Everitt I. Brown, First National Bank Building, Fort Wayne, Ind., is architect.

The Warren Paper Products Co., South Fifth Street, Lafayette, Ind., has plans for a one-story addition, 50 x 120 ft., for which foundations will be laid at once. Walter Scholer, Painters' & Decorators' Building, is architect. Donald Warren is president.

Fire destroyed the post, paint, printing and warehouse department of the South plant of the American Steel & Wire Co., DeKalb, Ill., on June 25, with loss estimated at $50,000.

Pacific Coast

SAN FRANCISCO, June 29.

THE Ford Motor Co., Detroit, is asking bids until July 15 for its assembling plant at Long Beach, Cal., consisting of a main one-story factory unit, 390 x 930 ft.; two-story warehouse and distributing building, 80 x 440 ft.; oil house, 62 x 115 ft.; power plant, 80 x 98 ft.; reinforced concrete dock, 80 x 440 ft., and two-story office building, 40 x 104 ft., reported to cost upward of $1,000,000 with machinery. Albert Kahn, Inc., Marquette Building, Detroit, is architect. Bids to be received by B. R. Brown, chief field engineer, Ford company offices, Detroit.

The Kay Copper Mining Co., Canon, Ariz., is planning the construction of a new concentrating mill at its local properties, to cost more than $200,000 with equipment. Headquarters are at 25 Broadway, New York.

The Board of County Supervisors, Fresno, Cal., is considering the early rebuilding of the portion of the County repair shops recently destroyed by fire, with loss reported at $100,000 including machine shop and other equipment.

The El Segundo High School District, El Segundo, near Los Angeles, has awarded a general contract to the H. M. Baruch Corporation, Lincoln Building, Los Angeles, for a one-story manual arts and gymnasium building at the local high school, to cost in excess of $80,000 with equipment. Alfred W. Rea and Charles E. Garstang, Pacific Southwest Building, Los Angeles, are architects.

The Pacific Marine Airways Co., Board of Trade Building, Los Angeles, is having plans completed for a new hydroplane landing port at San Pedro harbor, with hangar, repair shop, lifts for planes, etc., main unit, 40 x 150 ft. W. K. Webb, 1235 East Tenth Street, Long Beach, Cal., is architect.

The El Dorado Talc & Rock Products Co., Placerville, Cal., recently formed by Paul F. Taylor, Placerville, is planning for the development and operation of quartz properties at the former Craddock mine, Bedford Avenue. A grinding and pulverizing plant will be provided.

John and Donald B. Parkinson, Title Insurance Building, Los Angeles, architects, have completed plans for a new

four-story and basement automobile service, repair and garage building, 150 x 160 ft., to cost about $250,000 with equipment. It will be owned by Earle C. Anthony, Inc., local representative for the Packard automobile.

The Monrovia City High School District, Monrovia, Cal., David H. Ray, secretary, plans for the construction of a vocational shop unit in connection with a new high school group in the western portion of the city. A bond issue of $625,000 has been authorized, and plans will soon be drawn.

Canada

TORONTO, July 5.

MACHINE tool sales the past week showed a sharp decline compared with other weeks in June, but it is believed that the monthly average will be well up to that of May. Business the past few days was affected by the holidays on the first and second of July when practically all trade in this country was suspended. Inquiries are numerous and many of the kind that usually turn into orders. Canadian railroads continue to buy for shops in Eastern and Western Canada. A good demand is reported for single tools for replacement, for practically all lines of industry and from all sections of the Dominion. The automotive industry is not buying as freely as earlier in the year, but a steady flow of single orders is being received from garages and repair plants.

Work will be started at once on the mills at Fort William, Ont., for the Great Lakes Paper Co. The first unit will have a capacity of 100 tons per day with provision to increase this capacity to 250 tons. Other units will be added up to 550 tons. It is the intention to have the mill in operation before the end of 1928.

The E. J. Phillips Electrical Works, Ltd., 5795 de Gaspe Street, Montreal, will purchase equipment and tools in connection with new wire mill on which work will start immediately at Brockville, Ont.

P. Joran, 3670 St. Andre Street, Montreal, is asking for complete equipment, including tools, for a garage and automobile repair plant.

McGregor & McIntyre, Ltd., 1139 Shaw Street, Toronto, have taken out a permit for $18,000 plant addition. The company fabricates structural steel, etc.

Additional contracts have been awarded in connection with a $100,000 extension to the plant of the Verity Plow Works, Brantford, Ont. The Britnell Contracting Co. has the general contract.

Foreign

THE Minister of Public Works, Government of Ecuador, Quito, has had specifications drawn and a list of equipment to be purchased for a proposed electric light and power plant, with water and sewage systems at Esmeraldas. The lists are on file at the office of the Bureau of Foreign and Domestic Commerce, 734 Customhouse, New York.

The Tenryugawa Hydro-Electric Co., Tokyo, Japan, operated by the Toho utility interests, has plans for a new hydroelectric generating station to develop an initial output of 66,000 hp. Extensions will be made also in transmission lines.

The Administration of Aeronautics, Brussels, Belgium, has plans under consideration for the development of the commercial aviation field at Evere, converting it into a modern airport. The work will include the construction of hangars and repair shops to accommodate at least eight large commercial airplanes, fuel storage and distributing plant, etc. A radio broadcasting station, with steel towers will also be installed.

The Great Indian Peninsular Railroad, Bombay, India, plans the installation of a cold storage and refrigerating plant in connection with other extensions and improvements at its local terminus. The entire project will cost close to $3,000,000 and is scheduled for completion in 1928.

The Stores Purchase Committee, Bangalore, Mysore State, India, will make purchases of electrical machinery and equipment in connection with its hydroelectric power developments, transmission lines and distributing systems.

NEW TRADE PUBLICATIONS

CO_2 Meters (Electrical).—Leeds & Northrup Co., Philadelphia. Bulletin 781 in 24 pages with folding insert illustrates and describes a new electrical meter based on the thermal conductivity method and designed for boiler room use. The instrument is reported to have gone through four years of development in the research laboratories with two years more in every-day boiler room service. Drawings of various parts of the equipment, together with diagrams showing control of combustion, etc., are given in considerable profusion, many of them in color.

Ball-Bearing Vibrating Screen.—Niagara Concrete Mixer Co., 40 Pearl Street, Buffalo. Folder describing a screen for vibrating foundry work and for other sizing of sand and gravel. It is made in three sizes, with capacities ranging from 20 to 250 tons per hour. The machine is built with two and three decks, as well as a single deck.

Flexible Shaft Grinder.—Keller Mechanical Engineering Corporation, 70 Washington Street, Brooklyn, N. Y. Folder devoted to features by the BK flexible shaft grinder. Accessories are also shown.

Forging Machines.—National Machinery Co., Tiffin, Ohio. "Forging Machine Talk" No. 61, devoted to a preparatory upset job for a drop hammer. A sliding type of die is used for making the upsets, which are at points between the ends of straight round bars.

Turret Lathes.—Jones & Lamson Machine Co., Springfield, Vt. Attractive booklet of 12 pages picturing on gray half-tone background the company's Hartness flat turret lathes. Both bar and chucking machines are shown in double-page spreads.

Metal Stampings.—Crosby Co., Buffalo. Booklet 12 pages, devoted to pictorial representation of several intricate stampings made by the company during 1926. The photographic reproductions are large and except for a prefatory statement relating to the company's service and the weight, size and material from which each part is made, the booklet is devoid of text matter.

Worm Gear Speed Reducers.—Fawcus Machine Co., Pittsburgh. Bulletin E, 32 pages. Describes the company's type WL worm drive which incorporate Timken tapered roller bearings. Dimensional sketches, ratios, efficiency and horsepower ratings are given in a separate section. Data are also given on the company's worm hobs. Illustrations are large and type matter is arranged to facilitate reading.

Transfer Pumps.—Wilson-Snyder Mfg. Co., Pittsburgh. Bulletin W-178C, dealing briefly with the company's transfer pump for the handling of oils and other liquids.

Drop Forged Tools, Etc.—J. H. Williams & Co., Buffalo. New pocket-size edition of the company's general catalog, containing complete information on wrenches, tools and forgings, tool holders, pipe fitters' tools and other equipment. Of particular interest is the section, included for the first time, showing the line of chrome-molybdenum steel Superrenches, offered singly and in sets. The catalog also covers the company's new standard finishes for drop-forged wrenches of carbon steel.

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